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INDUSTRIAL-ARTS MAGAZINE

Vol. VI FEBRUARY, 1917 No. 2

A Decade of Industrial Education in Wisconsin

L. D. Harvey, President of Stout Institute, Menomonie, Wis.

DURING the past decade, and especially the last half of it, we have heard a great deal about Industrial Education, Vocational Education, Pre-vocational Education, Agricultural Education, and perhaps some other varieties. A number of individuals and a few legislatures have attempted to fix definitions of these terms but there is not as yet a definite, generally accepted definition for perhaps any one of them.

Industrial Value of Elementary and Secondary Subjects.

Industries have been developed and carried on for a great many years. No one will deny that in some very real sense our public school system, organized as it has been, has given a kind of education that has been of some value to the men engaged in the industries, and that even our investigation and research work in the field of pure science have contributed, thru further work, in applying the results of this research and investigation to the development of our industries. It would be absurd to claim that the instruction given in the public school system in the common elementary subjects and also in the secondary subjects, did not give a kind of training that is valuable for either the hand work in the industries or for the man engaged in the organization and administration of industrial enterprises, and yet we have not thought of calling this work Industrial Education.

Traditional Subjects Inadequate for Industrial Worker.

When we come to analyze the specific demands for education in this, that, or the other industry, we find that at least a certain amount of work such as the elementary school and the secondary school at present organized undertake to give, is basic, but we also find that it is inadequate, either for the best results in the individual as a man and citizen or for the best results in the industry. It is further coming to be realized that this lacking element is very closely and directly related to the industry; that until very recently this particular part of Industrial Education which related directly to the efficiency of the worker has been acquired, when acquired at all, in the actual work demanded in the industry. It has been acquired as an incident solely, and without proper regard for systematic, orderly, economical development of power and skill on the part of the individual. When I say that this education as attained in the industry is an incidental product, I mean to call attention to the fact that the industries are organized for the production of inanimate objects and for their production on a commercial basis in order to warrant the continuance of the industry. The industries are not organized as schools, recognizing a definite, distinct and accurate order of progress and development in mastering the knowledge and skill required for success in the industry. For that reason the education of the worker is a by-product.

Slowly the idea has been growing, first among educational men and still more slowly among men in the industries, and even yet not generally recognized, that a productive industry organized to put out products on a paying commercial basis, is not the best place to teach the worker the things he needs to know and to develop the skill he needs to have for good workmanship in the industry.

Recognition of Industrial School Slow.

Here and there people have come to see that the education for skill in an industry involves an education of the mind and that there is a definite, wise, orderly mode of procedure necessary in order to gain the best results in the least time. In other words, that the education of a boy or girl, no matter in what direction, is a distinct and definite problem and an entirely different problem from that of producing material products for the market. They are slowly coming to understand that this work may be begun in a properly organized and equipped school with adequately trained teachers and may secure excellent results in much less time than these results are now secured thru the ordinary apprenticeship in the industry. They further recognize that the school will not fully complete the education of the worker for the industry, but will give him so much more systematic training co-ordinated with the related knowledge, that a very short time in the industry will complete his education for the trade or vocation and make him more efficient as a man and as a workman than if obtained in the industry alone. They are also coming to recognize the fact that the education of the industrial worker may be very greatly aided by appropriate class instruction, by skilled teachers classifying and supplementing the knowledge and training he is acquiring as a worker in the industry.

A few people recognize the fact that there are good reasons why these views have not been accepted

earlier and more generally. First, because little thought has been given to the subject until recently; second, because the man who is managing the industry has never organized or managed the business of systematically educating people and therefore it is a new question to him. He is very likely to think, and does think, if he thinks at all, that the mode which has been employed in developing men for the industries is the only mode. This same conservatism may manifest itself in his own industry and result in his delaying the introduction of improvements in processes, in organization, and in administration which are demonstrably superior to those he now employs. It is the conservatism of the established order of things. It obtains in education just as it does in the industrial or in the commercial world and yet when we compare conditions in any of these fields today with those of one hundred or even fifty years ago, we are astonished to see how the old conservatism has been modified and with what excellent results, and in that we see the promise of further modifications with correspondingly good results. On the educational side this conservatism manifests itself in a dislike to break away from the established and traditional course of study and order of work.

Fallacy of Schoolman's Opposition.

Many schoolmen today are arguing against Industrial Education because of the fear that somehow or other it will injuriously affect and modify the old system. They believe this demand for specific education for the industry is a demand to modify a system in the interests of the exceptional individual, or they profess to so believe. They think of the cultural benefits to be derived from the secondary and higher courses of instruction and forget that the great mass of the people engaged in the industries have never been in either the secondary or higher schools and that additional opportunity for them to fit themselves better for industrial work, to give them a greater wage-earning capacity and therefore better living conditions, does not affect at all the mass of people who are fortunate enough to complete the secondary and higher courses of education, because this demand for Industrial Education does not imply in any way a lessening of opportunity for the broader and more extended cultural education for those who are so situated financially, and so endowed intellectually and emotionally, as to profit by the higher education.

Fallacy of Employer's Complaints.

Men in control of industries are complaining of the lack of preparation on the part of the men coming to them for employment, and it is doubtless true that their complaints are well grounded. As I have said before, they are apt to think that there is no possible way in which a man may be trained to do good work in any given industry except in the old way, by entering the shop and serving his established apprenticeship. They assume that when he has done this he is a skilled workman, and yet they fail to recognize how very few standards of efficiency have been established and accepted by men responsible for the management of industrial establishments even in the same industry. What the industries need more than anything else is a further study in the field of scientific management for the purpose of noting and standardizing processes as the very best obtainable in the industry. Men like Taylor, Emerson, and Gilbreath have blazed the way in this field, and yet not a tithe of the truth they have formulated has been accepted in any given industry. Few people engaged in educational effort have given extended study and thought to what is essential for the best results in Industrial Education and to the conditions which are essential in order that these results may be secured.

Reasons for Failure of Some Industrial Schools.

Here and there schools have been established as trade schools or vocational schools, and the results they have secured have not been satisfactory in all cases. They have perhaps attempted to do too much in a given time; they have had inadequate equipment, they have had teachers who have not been specially prepared for this work, their courses of study were not the results of an analysis of what the individual needed to know and what skill he needed to possess, and how this knowledge might be acquired and this skill developed most expeditiously and economically. They have undertaken to do this work with inadequate equipment and without a sufficient knowledge of what is demanded in the industry and thus have paved the way for a condemnation of the industrial school by the practical men in the industries. The fact must be recognized that teaching is an art and it does not matter whether a person is teaching Latin or blacksmithing the aim, in either case, is primarily to develop mental alertness and power in dealing with the elements of the subject under consideration; that in industrial education there is demanded still further a co-ordination of motor activities with mental activities, thus requiring for skill in this work the very highest order of training and the clearest perception of the nature of the person being trained, of his mental endowment, of the necessary modes of mental activity, of the correct and accurate forms of motor activity and how to make an appeal to the pupil which will secure these correct forms of activity of both kinds most directly. There must be a recognition of the fact that a plumber who can wipe a joint correctly has one element that is essential in teaching another to do the same thing correctly, but it does not follow that he has the other element, the teaching power—the power of analysis of the processes in his teaching

into their elements and their related order nor of the mode of presentation which will appeal to the apperceptive mass of the individual being taught, and so assimilated. Men in the industries very properly object to a person's undertaking to teach a trade when he does not know it thoroly. Men in the teaching profession just as properly object to a man who knows a trade, undertaking to practice the art of teaching which makes an entirely distinct and different demand upon his capabilities.

Preparation for Industrial Teacher.

We must come to realize what Germany has realized after more than a half century of experimenting with Industrial Education: That the teacher of the industries must be thoroly trained both from a pedagogical standpoint and from the standpoint of the necessary shop procedure and knowledge related to it; further, that the best mode of procedure is not to take a man from the industries where his ideas have definitely crystalized and attempt to make a teacher of him, but to begin his training as a teacher before he has been too long in the industry or even before he has entered upon it at all, and to give him a broad mental training; a professional training on the pedagogic principles involved in teaching, a practical training in shop procedure and in the principles of administration and organization of the industry to be supplemented by actual work in the industry itself, before he becomes a skilled teacher. It has taken Germany fifty years to reach this conclusion. We need not accept it because Germany has finally accepted it, but we need to accept it because common sense and an application of psychological and pedagogical principles lead to the same conclusion.

[Establishment of Continuation School System.

Six years ago the Wisconsin Legislature enacted a law providing for the development of the continuation schools. These schools were planned for those who had withdrawn from the public or private school with only the rudiments of an education and who had become wage earners. This law grew out of the recognition of the fact that most of these workers had left school at the close of or before the end of the elementary course, few of them having ever entered high school, and that further education was needed in order for them to make the most of themselves as human beings, citizens, and as industrial workers. The education facilities which the law required these schools should furnish were not entirely industrial in their aim or scope. Such subjects as reading, arithmetic and language as taught in the elementary schools are a basis for industrial efficiency, but these schools were expected to do more than the elementary school or even the high school. They were expected to bring under their influence the young workers in the industries and to give them instruction directly related to the work that they were doing, with the end in view that they might become better workmen with greater earning capacity as well as better citizens. These schools have been established in 29 cities of the state and may be established in every city of 5,000 or more population. That the legislature believed that such an extension of our school system was wise and that it should be encouraged, is shown by the fact that provision has been made for the cost of one-half of the instruction in such schools to be paid from the state treasury, amounting now to $150,000 annually, leaving the balance to be paid by the city in which the school is organized. The limit of $10,000 to only one city has since been increased in cities of the first class to $20,000, perhaps a discrimination against the large city where the demand for this work is the greatest because it is in the large cities that all leading industries are most developed. That the people in the cities where these schools have been established believe in them and in the wisdom of the law is shown by the fact that each city has steadily increased its tax levy yearly for their maintenance. Four types of schools have been organized under this law: the All Day Industrial school for permit pupils temporarily unemployed, or who having permits to work have decided to go to school instead; the Day Continuation school for the permit pupil and the apprentice; the Evening school for the industrial workers who are not apprentices; and the Commercial school, the latter not distinctly industrial. The law provides that these schools shall offer instruction in English, in hygiene, in safety devices in the industries, in citizenship in addition to industrial subjects. How far the industrial phases of education are being given in these schools is shown by the fact that instruction has been given in the following subjects, and at the present time, probably is being given in additional industrial subjects in the 29 cities operating under the Continuation School Law, tho not all of these subjects are given in any one city: plain sewing, dressmaking, cooking and food study, millinery, mechanical drawing, pattern-making, shop arithmetic, shorthand and typewriting, English for foreigners, woodworking, drawing, safety devices, shop practice, freehand and mechanical drawing, electricity, gas engines, gas producers, printing, telegraphy, shop drawing and mathematics, tanning, moulding, sign painting, window-card lettering, architectural design, woodturning, cabinet-making, baking, automobile instruction and repairing.

Growth of Enrollment.

The State Superintendent's Assistant in Industrial Education reported for the year 1913-14 the following enrollment in these schools: Apprentices, 274; Industrial schools, 513; Permit schools, 5,223; Evening schools, 6,209. In the year 1915-16

there were enrolled in the Industrial schools established in 24 cities of the state, 4,303; in the Continuation schools or Permit schools, in 27 cities of the state, 14,284; in the Commercial schools, in 28 cities of the state, 17,176, making a total of 36,701. The average attendance is one person in 22 of the population in 29 cities maintaining these schools, varying from one in eleven in West Allis to one in 43 in Eau Claire.

Per Capita Cost of Schools.

The average per capita cost for the year 1915-16 was in the Industrial schools, $23.95; Continuation schools, $13.58; Commercial schools, $20.38; Evening schools, $8.24; average in all schools, $12.45. Separating the schools into six classes for the purpose of comparison of the per capita cost in the various schools, we have the following table:

		Industrial.	Continuation.	Commercial.	Evening.
Per capita cost less than $10	Class 1	1	2	1	22
Per capita cost $10—$19	Class 2	9	16	4	6
Per capita cost $20—$29	Class 3	3	4	2	..
Per capita cost $30—$39	Class 4	5	..	1	..
Per capita cost $40—$49	Class 5	2	2	1	..
Per capita cost $50 and above	Class 6	4	3	2	..

It may be interesting to note the maximum and minimum per capita expenditures in each of these schools. In the Industrial schools the lowest is $9 in South Milwaukee, and the highest $123 in Neenah. In the Continuation schools the lowest is $8.23 in Menasha, and the highest is $68.23 in Madison. In the Commercial schools the lowest is $7.53 in Racine, and the highest is $89.15 in Fond du Lac. In the Evening schools the lowest is $1.31 in Marshfield, and the highest is $18.60 in Green Bay. These variations in cost are explainable in some cases by the fact that a very low enrollment may mean a high cost for the instruction per capita, while a high enrollment may reduce the per capita cost, tho in a number of cases there is no apparent explanation of this wide diversion in cost. Probably the explanation that would cover the largest number of cases lies in the difference in classification of the schools in making up the reports of the various superintendents. The growth of schools established under the Continuation School Law appears from the following: In the year 1912-13 there were enrolled 12,000 pupils; in the year 1915-16 there were enrolled 36,701. If we leave out the 938 enrolled in the Commercial schools we have 35,763 enrolled in these schools where the great majority of the work seems to be of a kind to be of use to the industrial worker.

Purpose of Work.

It may be objected that not all of the work given in any one of these types of schools is strictly industrial in charcter. It is hardly worth while to quibble over definitions. The real important question is whether the work in these schools is of a kind adapted to the needs of those who plan to enter or will enter the industries and of those already in the industries; the purpose in any case to make those being educated better men, better citizens, and better industrial workers and to stimulate their ambition to better their conditions and to furnish aid toward such betterment. It may be that some of the work offered in these various types of schools is quite similar to that which can be obtained in the regular public school classes, but the fact is that the people who are attending these schools have left the public schools and therefore are not availing themselves of whatever opportunity the public schools may offer them. The new type of schools while presenting this work which will be of value to the individual either in the industries or elsewhere, is also offering what the regular public schools do not offer, a wide variety of work especially adapted to the needs of industrial workers. It is doubtless true that this latter type of work is in many cases not well organized, that equipment is lacking, and that the highest skill in teaching is not always manifest. If it were not so it would be the first instance on record of the development of a new type of school adapted to the masses where this condition did not exist. Our ideas as to the kind of instruction best adapted to the industrial worker have come from our study and observation of schools offering this type of instruction in the large cities of this country and Europe.

Social Conditions Determine Character of Work.

Wisconsin has few large cities. It has a few cities of the second or third class that are distinctively industrial in character. In most cases the industries in any one of these cities are not great in variety and therefore the majority of the industrial workers in the community are engaged in a limited number of industries and the demand for the new workers is similarly limited. This condition indicates very clearly the particular type of industrial education needed for that community, limits the number of types required and furnishes a number of students sufficient to organize good classes in each type. Under such conditions the problem is not difficult of solution, but in many of the cities where the industries are few and employing but a limited number of operatives, the conditions are such as to preclude the possibility at present of organizing classes for the small number of pupils that would present themselves from any given industry. A type of work must be selected that is more general in its character especially on the side of motor training into which may be gathered the small groups from the different industries for this more general work.

Lack of Organized Material for Instruction.

A great difficulty which presented itself at the very outset of the attempt to organize instruction in the new schools was the lack of any considerable

material in available form for instructional purposes in the various types of industrial education. This difficulty was equally apparent to the University authorities when they began the organization of their extension work in the industrial field. They were compelled at once to enter upon the work of preparing texts which could be used in their extension classes. They have had to work these texts out, test them in the classroom, rewrite them, retest and finally put them into permanent form. They are still at work upon that problem. Their problem, however, was in many respects different from that in the Continuation school field. They were preparing material for the adult worker while that in the Continuation school field had to be prepared for the boy and girl of from 14 to 16. It is very evident that work admirably adapted for the adult worker would not be at all adapted to the children in the Continuation school. It might furnish a point of departure provided it began with that which is more difficult, selecting such portions as might be simplified and organized for the Continuation school classes. That is one way in which material for the instruction of elementary grade pupils looking toward the industries may be developed. It is not the only way. It may be developed from the standpoint of present attainments and capabilities of the 14 to 16-year-old children by a determination of what is needed in knowledge and skill for effectiveness in any given industry, and what of that, the 14 to 16-year-old child is able to comprehend and assimilate, and it then needs to be organized with reference to the proper order for presentation.

This work has been going on slowly, but much yet remains to be done. Conferences of the Continuation-school teachers have been held from year to year in which courses of study have been considered, the experiences of teachers drawn on, new standards presented and discussed, and each year the results of these conferences show a very marked advance in the direction of a better organization of instruction material. It will be years, however, before that problem will be worked out in a manner even approximately satisfactory, and long before it is thus worked out, it will become evident that changing conditions in the industries will involve continual changing in the courses of study.

Scope of Industrial Education Too Narrow.

Thus far in thinking of industrial education, we have had in mind chiefly the processes of a given industry and education in these processes. That is not all of Industrial Education. It must be realized that it comprises also education as to the *conditions* under which the industry is established and the conditions under which such an industry may be successfully maintained; that these conditions deal with a great variety of things, like the availability of raw material in sufficient quantity at prices which will enable the manufacturers to compete with similar industries in other localities; the available labor supply, its cost, its quality, its probable permanence; the shipping facilities as compared with shipping facilities of other competing industries; the cost of power; the nearness of the market; and the available technical and scientific knowledge that may be utilized.

Furthermore, industrial education must take account of the *organization* of the industry involving a large number of elements; the selection of location, the providing of shipping facilities into and out of the factory; the kind of machinery, its location and arrangement in the various shops; the movement of material from the time it reaches the factory thru every process to the completed product; the determination and installation of an adequate cost and accounting system; the establishment of a proper selling agency; the organization of the working force, the duties of the foreman, the superintendent, manager, etc.

Third, and last, Industrial Education requires a knowledge of what is essential for good *administration*, for, given first-class *conditions* and wise *organization*, the success of the industry may yet depend upon the wise *administration* of the various forces and activities employed. The Industrial management has to deal with the human element in production and disposal of the product.

We may say that we have been thinking of Industrial Education in terms of processes because those who are employed in the processes involving the use of tools and machinery are not the persons who are responsible for a knowledge of the industrial conditions or for the organization and administration of the work in the industry and yet, if more of the men who are employed in the processes a given number of hours a day, were given a wider outlook as to what are the industrial conditions, what are the essentials in organization and administration of industrial activities for success in the industry, there would be better relation between employer and employee, better opportunity for advancement on the part of the process worker and better conditions for all concerned.

These considerations of industrial conditions, organization, and administration as essentials in any adequate scheme of industrial education indicate how much has not as yet even been attempted in the matter of formulating and organizing industrial courses of study and how much remains to be done.

Few Workers Apprenticed.

The attempts to administer the Wisconsin Apprentice Law brought out very clearly the fact that there are thousands of workers in the industries who have never been apprentices and who never will be apprentices; that many of the industries in which they are engaged are of a type that are not likely ever to indenture apprentices. These industries are

not trades. They are those in which there are a greater or less number of machine processes, where the rate of pay is practically the same and where the difficulty of acquiring the mastery of a given machine process is not great. It is immaterial whether the young men entering one of these industries are to be apprenticed or not. The fact is that they need education beyond what they have had, and it is the business of the Continuation school to furnish that education. It is unquestionably true that very much remains to be done in the development of the continuation school work for the individual over 16 years of age who is engaged in the industries or who plans to enter a given industry. An examination of existing schools will show that the emphasis has been placed upon furnishing school facilities for those between 14 and 16 years of age, but the fact must not be ignored that the Continuation School Law contemplated provision for not only those classes but for those 16 years or over in the industries who might wish or need instruction.

Need of Industrial Education for Apprentices and Other Workers Above Sixteen.

I believe the development of the work in these schools up to the present time has been along the right line but that we are now prepared to enter upon a vigorous campaign for the development of the instruction adapted to the needs of those of apprentice age and older in the industries. During the years the law has been in operation there has been very much discussion of industrial education. During that same period men who are controlling industries have discussed the question as never before. Great corporations have organized schools for their own workers and the labor organizations have been discussing the question and have been watching the experiments with keen interest. All parties are now in a state of mind to consider arguments and plans for the establishment of schools for these more mature workers. The manufacturer has been in the process of being educated and has come to believe that it is worth while to better the education of his workers. The labor organizations have studied the problem and see that labor has nothing to fear but everything to gain from a properly organized system of industrial education.

This phase of the work seems to me to be of vital importance at the present time and the best efforts of all concerned should be given to its immediate further development.

University Extension an Important Factor.

It is worth while to note what has been accomplished, and is being accomplished, in another field and in another type of educational effort. The University of Wisconsin thru its extension department has entered upon a wide range of instructional work. The avowed principles upon which this work has been developed are fundamentally sound tho they have not been generally recognized. The University has been a pioneer in this work but the scope of my paper allows me to touch only on a single phase of that great work.

Begun ten years ago, there were enrolled up to July 1st, 1914, in drawing, engineering, surveying, and business correspondence courses 10,141 students, while in these same courses there were registered during the year 1914, 2,264, showing a very steady increase in the number of people availing themselves of the opportunity for industrial education afforded by the University.

Of 5,786 students in correspondence courses reporting as to the occupations in which they were engaged, 317 different occupations were mentioned, a very large number of which would be distinctively classed under the head of industrial activities. The average age of these students is between 26 and 27 years.

Bringing the enrollment down to the current year, 8,682 students have been enrolled in the engineering and industrial courses. What have they gained from these courses? The State Superintendent reports that 44 per cent of the students entering the high schools graduate from these schools. Of those who entered the University six years ago as Freshmen, 40 per cent have been graduated. During the ten years the correspondence work has been in operation, 40 per cent of the whole number enrolled have completed the course for which they were enrolled and during the last biennium, 66 per cent have completed the courses in engineering and industrial studies. This does not mean that they have completed a University course, but it means that in the particular courses in which they felt they needed help, 66 per cent have persisted to the completion of the courses they entered upon. This certainly is a very large contribution to Industrial education in the state.

Outside the correspondence work, instructors have been sent out from the University who have organized 35 classes of groups of students in different parts of the state in industrial subjects during the biennium ending June 30, 1914. Five hundred and fifty students actively engaged in the industries attended these classes during that period.

The University sends out package libraries to Continuation schools where definite information is required regarding any particular industry that is being studied.

During the ten-year period the University has prepared and printed 24 texts chiefly for instruction in the industrial and engineering field. In the beginning of the work of instruction in its field classes, work was offered which is now being given in the Continuation schools. As fast as the Continuation schools can take over that work that portion of the field is abandoned by the University and its efforts

confined to the more advanced lines and those not within the distinct field of the Continuation school.

There are numerous other ways in which the University is contributing to the field of industrial education. It may be difficult to classify these efforts because this instruction may not be given to classes. It is neither correspondence work nor classwork but when it sends a man into a municipality to furnish the definite and exact information as to any problem in municipal engineering, it is educating a certain number of people and the people in the community are being educated in some degree by the discussions that take place in the community and by the final action decided upon.

Industrial Education by the Agricultural College.

No consideration of the development of industrial education during the past ten years would be at all adequate which did not take into account the splendid work in the agricultural phase of Industrial Education carried on by our Agricultural College. The most important industry in this country is Agriculture, and more definite knowledge of practical value in industrial education has been worked out in the field of agriculture and is being used for instructional purposes than in any other industry in the world. Those who remember the conditions during the early attempt to develop courses of instruction in the Agricultural Colleges, will recall how slow the progress was in the early years. They will remember how many years elapsed before there were even a respectable number of people enrolled in our own Agricultural College. They will remember when the Farmers' Institutes were organized, how large a portion of the farmers came to them out of curiosity and a large number of them to scoff, and in early years they did not remain to pray, and yet the results of industrial education in this field in the State of Wisconsin have added millions upon millions of dollars to the wealth of the state and also to the wealth of the individuals engaged in farming. It has made farm life more tolerable, more independent and more desirable in every way.

We are having, and shall have, very much the same experience in broadening the field in Industrial Education so as to do for the other important industries of the state what we are doing today so successfully for agriculture. Did time permit, I should be glad to enumerate the various activities carried on under the auspices of the Agricultural College for the farming industry in Wisconsin. It would astonish many of you, and if the definite results in the way of solid attainment and increased production could be put before you, you would be still more astonished. More than twenty years ago I urged as strongly as I was capable of urging upon Dean Henry of the University, the desirability of sending out men into the field to carry to the farmers the results of the experiment station work and of the other activities of the college, to give this information directly and thru demonstration rather than to depend upon bulletins which were issued by the thousand and read by the score. Within the past five years this work has been undertaken thru the development of the country representative of the University, the active worker in the field. No one thing has been attempted by the College of Agriculture that promises such splendid returns as this close contact of well trained, tactful, qualified men with the farmers, bringing to them in a way that they can apply, the practical results of scientific research and investigation.

The Extension Department of the University has within a few years broadened very generously the scope of University activities and has reached out to aid and influence those who live outside the immediate atmosphere of the University and its academic walls. The encouraging thing about it is that the whole people are being educated. Twenty years ago a proposition to expend the money now expended in many lines of educational work would have received no consideration whatever. At that time one who was bold enough to recommend that a county pay $3,500 a year for the services of a representative of the agricultural college in the county to come in personal contact with the farmers and to bring to them the latest results of research and experiment adapted to their needs, would have been greeted with derision, but people have been educated to see that wise economy in education does not necessarily mean small expenditures.

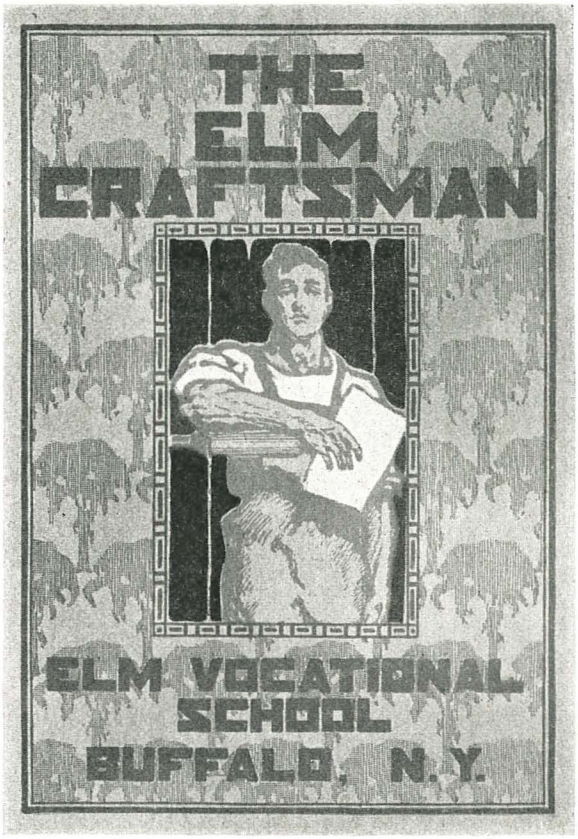
Serious Lack of Trained Teachers.

One of the serious difficulties in the development of the Continuation school and especially that phase of it which deals most directly with the industries, has been the securing of adequately trained teachers. There had been practically no discussion of the Continuation school and its possibilities prior to the enactment of the law. There had been no demand for specially trained teachers to undertake this work and when the law came into existence practically nothing was done for a year's time. When the schools began to be organized teachers had to be obtained and the character of the work to be attempted was necessarily controlled to a considerable degree by the teaching force available to undertake it. Even after the schools were started there was no definite standard either in the courses of study, purposes to be realized or as to necessary qualifications of teachers. Still the work had to be continued and teachers employed who seemed to possess some qualifications for the work to be undertaken or work had to be deferred because the teaching force likely to make it a success was not available. Institutions training teachers for work in Manual Training and

Home Economics were doing work most nearly along the line deemed necessary for the preparation of industrial teachers and yet it was realized that the work was not the same. These institutions have been modifying their courses and offering new courses for the purpose of preparing people as industrial teachers. No large number of people presented themselves to take this training. They did not feel sure that the outlook in industrial education would warrant their abandoning their present line or work to prepare for a new one. That condition is rapidly disappearing.

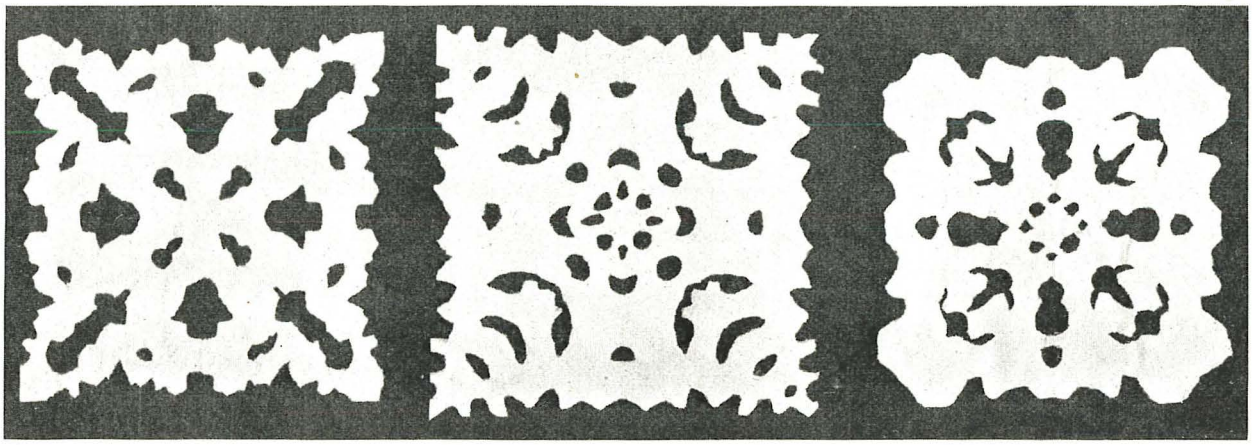
Important Results of Experience.

The most important results in a decade of Industrial Education in Wisconsin is that a good beginning has been made, that the problem is being seriously considered and attacked, that a sentiment has been aroused among all classes favorable for its development, that agencies have come into existence thru legislation and thru educational foresight and organization in existing institutions capable of carrying it on to the highest degree of usefulness, that all earnest, intelligent advocates of industrial education realize that its full development is a 25 year undertaking, and that success even then requires concerted, harmonious action by all in any way responsible for such development and then sympathetic support of the people of the whole state.



A NEW SCHOOL PAPER.

The illustration above is a miniature reproduction of the cover page of a new school paper published by the printing class of the Elm Vocational School at Buffalo, N. Y. The original magazine is seven by nine inches in size, and the cover is printed in three colors—gray, orange and white on a gray stock. The magazine is to be issued quarterly, and is to contain news of the school and information for parents and prospective students.



SOME OF THE PATTERNS PRODUCED BY THE STUDENTS.

The Reminiscences of a High School Drawing Teacher

II. LETTERING

Maud M. Miles, Manual Training High School, Kansas City, Mo.

LETTERING is the first thing in our course of study for all grades. It is the easiest thing to teach under the unsettled conditions at the first of the year.

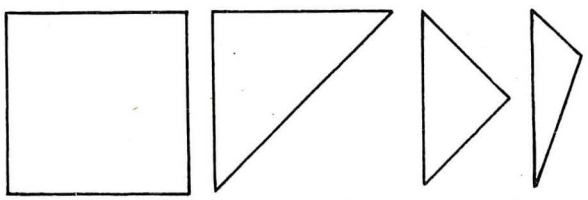
The first few days of school this year there were three sets of classes organized and only two of us to teach them. We were moved from class to class and the pupils transferred into new groups daily. The periods were cut to fifteen minutes for each class and it was necessary to invent lessons that could be given in a short time.

It was not advisable to have them bring many materials until the classes were settled so we spent several days in what I call "military" drill, because we all "executed our manouvers" at once—and at command.

"Let us begin the year's work by limbering up our muscles and minds," I suggested. "What muscles do you use to draw with?" Some pointed to their fingers from the knuckles to the tips. I asked for other opinions. One was bold enough to say that she used her hand up to the wrist. I wiggled my fingers and hand up the wrist and held my elbow conspicuously stiff. "We use the muscles of the elbow," another declared. Then I took a crayon and began drawing lines on the board, using a full swing of arm movement—and even allowed my body to sway slightly from the waist, in order to give a long swing to the lines. Then I advised them to use the whole arm in drawing and the whole body if necessary. I told them that if they were doing big things in a studio they would stand, so they could sway their body and step back and forth.

Then I distributed scratch paper such as is supplied by the Board of Education and our "Military Drill" began. I had each one place a sheet of paper on his desk with the long edge of the paper parallel to the front edge of the desk. "A straight line," I explained (as if they had never heard of such a thing before), "is the shortest possible distance between two points." "Place two points on your paper an inch below the top edge and each an inch from the right and left edges of the paper." "Place the pencil point on the left-hand point and keep your eye on the right-hand point. When I say 'Draw'—everyone do so—and let us see if we can all hit the right-hand point at the same instant. Now ready—One–Two–Three–Draw." I began the laugh at the result. I wanted to limber them up in every way, mentally as well as physically. All measuring was done with the eye. All lines were drawn freehand.

In a similar manner they drew as many lines as the paper would hold, one-fourth inch apart; drawn from left to right. Then the process was reversed—the whole class drawing from right to left at the count of three—with a free-arm movement. The next movement was to draw downward from the top margin of the paper to the lower margin. Toward the last, rapid drawing was tried—omitting the counting. I tapped on the desk and said "DRAW." Then they drew a page of right angles—acute angles—simple curves, and compound curves. The papers were handed in (to the waste basket.) On two of these unsettled days I distributed squares of paper and had the pupils fold them from corner to corner and then fold them again and yet once again. The first day we began by tearing out the center and



The Folds for Paper Tearing.

then tore any holes we cared to, along the edges. We compared the results when the papers were unfolded and discussed which paper made the prettiest design and why it was pretty. The next day's lesson was similar but we did not tear out the center of the paper.

The second week began with a brave attempt to letter the alphabet. I gave no hint in advance that I did not expect the first attempt to result in a finished work of art; but it met the fate of the earlier practice in drawing lines, and was put in the waste basket.

Then for four days they labored in an attempt to put the entire alphabet of "big" and "little letters," the numerals and a quotation all on a sheet of squared paper. They were required to hand in all their work on Friday and many had grown in their ideas to such an extent that they begged to take the work home and do it over. I always give the permission asked in such cases. I ask them to roll their paper to carry it, not to fold it. Any help given the pupils at home would be easily detected by comparison with the work he afterward does at school.

Sometimes I smile at myself when I look back at the early days of my teaching. Then I rushed around from pupil to pupil and said just about the same thing to each of them. Moreover, I took them, turn about, and helped each one over the hard places. There is not much of that sort of thing now-a-days. I often sit here at my desk and grade papers or I tidy up lockers and drawers—while the pupils do the work for themselves.

Many drawing teachers are like a doctor going from patient to patient—prescribing medicine for each and taking all the doses himself. The chief lesson that experience has taught me is not to hover over my pupils. I do not expect perfect results on paper from early efforts, but I do not fail to see that the effort is well directed and as many mistakes are corrected as the time and the growing courage and ability of the pupils make possible. Most of my general directions are given to the entire class. At the beginning of each lesson I walk around the class and generally look at their lettering upside down. Suggestions peculiar to the need of each pupil are briefly made—and such points as I see need explaining are then explained to the class. As a rule I allow the pupil to make an effort first and then I find fault with the results. I think it is possible to suggest mistakes to pupils by cautioning them against errors that they may never happen to think of making.

I always try to use a cheerful tone of voice in imparting disagreeable news to a pupil. I either express or imply confidence in the ability of the pupil to do better than he has ever done. A really successful teacher almost hypnotizes the pupil into doing things that he did not guess he could do. Dealing out information is a small part of the teaching business.

One mistake in lettering that is frequently the tendency of beginners is to put capital letters in a word that is being lettered in the lower case letters. One girl insisted on lettering her name PoLLard instead of Pollard. Another lettered her name AlicE instead of Alice. That little e is a hard letter for them to draw. I tell them to draw the level line first and then add an oval o. Then erase the part of the oval that is not needed and we have e.

A general rule in any kind of drawing is to draw all level or upright lines first and then to put in the lines that go in other directions. Of course in drawing objects, the law of perspective affects the apparent directions of level lines, but the vertical lines are always vertical.

All the letters in a page should be sketched in lightly so it will not be difficult to rearrange any part, or all, of it. Each student should plan the arrangement of his own page. When I see the work of a whole class arranged exactly on one plan I know that the teacher has done most of the thinking and planning, and the chances are that she has also done much of the drawing. I want my pupils to learn not only to take orders from me but to plan things for themselves. They learn by their mistakes, and if the mistakes are funny I laugh with them. I expect them to laugh. I think it is as bad for a student to take himself and his work too seriously as it is to be "feather brained" and silly.

If this plan be carried out the results on paper may seem a little slow at first, but the harvest is rich in the end—and the student has really learned what he thinks he has. It is sad to see the pupil, too often graduated from our high schools, who has much good art work to show, and who has an inflated self-esteem but who can do practically nothing without a teacher to help him along.

Some of the general instructions given my classes the last week were:

Dot the little i's on the line that controls the height of the capital letters.

Letter your names on the paper—large or small; in all capitals or in capital initials and lower case letters. Be guided in your choice by the kind of a spot needed to make your paper look better.

Such lower case letters as l, t, d, h, etc., should be as tall as the capital letters.

Make the body of the lower case letters all of a uniform height. Do not draw a line to control the height of these letters and then allow some of them to extend above the line and others to fall short of it. In drawing an S or a little g draw complete ovals carefully and then convert them into letters.

In drawing any letters draw the vertical lines first—especially in drawing the lower case m or n.

I do not give any mathematical instructions in regard to the proper proportions for the width of freehand letters. One may have a low broad space to fill or a narrow high space so they would have to distort the letters to fit the space. That is the first business of one who letters freehand. Of course, as far as he will have control of the space he would fill, he will plan to give the letters a space where they can be made to appear in better proportion. This week they have been lettering on the squared paper. Next week they will have to rule their guide lines.

Monday, the third week.

If my first consideration were one of good results on paper I should have a plan all worked out for the arrangement of the new page of lettering. The pupils will all letter the same quotations in order that I may compare their work more accurately, one with another. Each will have the same difficulties to overcome that every other one has to encounter.

Our first problem is really one of design and I have left each pupil to solve it for himself. Shall he place his paper upright or in a horizontal position? Will he leave a wide margin or a narrow one?

He must arrange for eight lines of lettering within some given space—and with a space between each of the eight lines. When the space is planned that is to contain each line of lettering, that space must be subdivided to control the height of the lower case letters. This should be more than one-half of the height of the capitals if it will make it possible to get the required number of words in the given space. Readjustment must be made and new papers started so the work will take a week for most of the pupils. Those who, by luck or ability, get thru early and well, may do some extra work for extra credit or may do some style of lettering different from the simplified Roman which we are using.

I advise the pupil to count the number of letters in each line in the following way. We will count the first line of the above quotation ||–|||–||||–||||||||||. You see I have put a dash between each word and in counting spaces I count these dashes as one full space, which makes 22 spaces for the first line. Even when we have this much space I have found it necessary to go around and say to many, "Crowd the letters closer together in each word. Widen the spaces between the words!" Care must be taken in ruling the guide lines to keep them parallel to each other and to the edge of the paper.

Wednesday, third week.

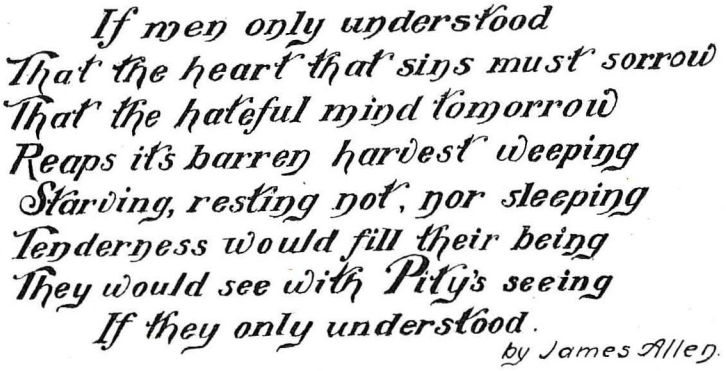
William finished his lettering ahead of his class and I allowed him to letter a poster advertisment for the school paper on the blackboard. He covered himself with colored chalk and glory and left the room, a happy boy.

Thursday.

Grace is lettering an ornamental page of school poetry. The only criticism I offered was to separate the page into two panels and to move the trees on two opposite sides of the page so one would not rest directly upon the other. She followed my suggestions somewhat reluctantly and so I desisted from further criticism. When I see the kettle about to boil over—I try to quit poking the fire.

Friday.

To remove the pressure of the exacting work the pupils have been doing, I posed a model today and let them make their first sketch without previous instruction or criticism. I graded papers at my desk and when they found that mild liberty was not reproved, they grew quite merry over their ridiculous first attempts. Every one was cheered and encouraged and ready to sketch again next Friday. These first sketches are to be saved to show them on the last day of school.



An Example of Lettering Produced in the Author's Classes.

The Wage Worth of School Training for Girls

Ruth Mary Weeks, Author of "The Peoples School."

In writing five years ago on the subject of vocational training, I remarked that the planning of further courses should be prefaced by a rigorous testing of the work of already established institutions and by a detailed study of industrial needs interpreted in the light of a constructive social ideal. Therefore it was with no small interest that I received a monograph on the "*Wage Worth of School Training for Girls*" from the pen of Miss Anna C. Hedges, a woman of varied social and academic interests, formerly director of The Hebrew Training School for Girls, now New York state agent for the vocational education of women. "Here," thought I, "is the survey which is to tell us at last what our vocational experiments have so far accomplished." But to my disappointment, I found that the training referred to in the title was merely that of the common schools and that according to Miss Hedges' own statement, "the specific kind of training which the school afforded could not be gone into" in the investigation upon which her book was based. I still promised myself, however, that in the monograph I should find the other half of my longed for prologue to successful vocational education—a detailed study of industrial needs interpreted in the light of a constructive social ideal. This hope was sustained by such introductory passages as that "industrial education has been directed largely in this country by school men and women whose contact with the industrial world has not been immediate, and plans formulated by them for industrial and technical training have been dominated more by what it seemed theoretically that boys and girls should have as a preparation for wage earning than by analytical study of workers, work and work conditions. Such needs can best be ascertained by tracing the history of the workers themselves; connoting their needs, successes and failures with the chief factors influencing them, and interpreting these findings by the aid of managers' experience with, and knowledge of, workers." But a second disappointment awaited me upon a perusal of the hundred odd pages of statistics with which the volume is chiefly filled. The information was general in character, limited in quantity and photographic rather than analytic in presentation, like the depressing realism of a Russian novelist who sees the meaning of life in its disordered facts and not in an effort to arrange them. As a result of lengthy investigation and tedious tabulation, Miss Hedges brings to light but three definite points; to wit, that among a comparatively small number of textile workers whom we have no reason to consider representative, so many had been to school so long; so many had worked so long in order to earn so much; and so many were of foreign birth or parentage. This was indeed curious and interesting information, but information not certainly typical and very little related, at least superficially, to the subject in hand.

It often happens, however, that the most valuable result of an investigation is not statistical data but vivification of abstract knowledge. "Only so much do I know as I have lived." Apparently this contact with industry deeply impressed upon Miss Hedges the great fact of specialization until trades have disappeared and only operations are left, operations often the same for many trades. Let me quote her own inferences from this fact. "Industry is so specialized today and promises to be so much more so in the future, that preparation for any operative line seems time and money wasted. Directors of education should endeavor to find out fundamental methods which are basic to the specialized operations and should classify and arrange them for general instruction rather than establish trade classes in lines where the trade is fast disappearing. Industry now is characterized by machines and operations, not by trades. It is informative to the school pupil to know the progress of raw material to finished product, but knowledge does not better a girl's chances for employment in the subdivided industrial process of today unless she has been trained in self-mastery, dexterity, and application."

The drift of this is obvious. Industry is so specialized that no one except managers needs to know a trade. Few women ever rise to managerial positions. For operative work, dexterity and concentration are the requisites. The time of apprenticeship is very short. Therefore, we shall waste time teaching girls a trade since all they need is dexterity and a habit of application.

Miss Hedges' conclusions are a curious proof of the hypnotic power of the actual: a situation realized intensely for the first time wears the aspect of fate and paralyzes critical judgment. Life says to every man, "Adapt yourself to me or die!" It is only the genius who can answer, "Adapt *yourself* to *me*—or stagnate!" The pitfall of vocational education has always been compromise with things as they are. The fact that in the factories inspected by Miss Hedges, the bright grammar school pupils take longer to reach the median wage than the average or even the underaveraged pupil, and that continued schooling is not only "unnecessary but prejudicial to wage earning" for the foreigner may indicate not that there is anything wrong with the school, but that there is something wrong with the factory. Perhaps it is the divine mission of schools to unfit the younger generation for life as it is. Perhaps the illiterate

foreigner earns and produces more in our piece-work factories than the literate foreigner or native because factories are too often run on a slave labor basis where helpless docility is at a premium. The school, with all its glaring faults, has at least been saying to the child, "Be a man." The factory says, "Be a machine." Perhaps it is only after the *man* is killed in the child that he can "approach the median wage." If so, it a hopeful sign rather than the reverse that the killing takes three or four years. The same resistance is manifest on the higher business levels. Young men who settle down slowly into the monotonous grind of narrowly specialized commercial and professional pursuits are not necessarily idle fools because they seek restlessly for a job which shall bring into play the whole faculty and personality of man.

Miss Hedges finds, however, sound human justification for high specialization. "A complex mentality wants and needs variety of work; but the simplification of the work in factories has been a godsend to thousands of workers who, if it were withdrawn from them by a change back to the old order of master mechanic work, would be wholly unable to find a place in the wage earning world and would perish prematurely from starvation and disease as they used to do when work demands were more exacting than in modern manufacture." This is true. The quarrel one has with Miss Hedges' conclusions is that she cannot go beyond the obvious good in current institutions. A review of the monograph in *The New Republic* has already suggested that woman's position in industry is not necessarily static. Why should we assume that women will never rise in large numbers to responsible positions in industry? Why need we assume that monotonous specialization is the final stage in industrial evolution? A large number of thinking persons maintain that the co-operation of workers in the administration of production is to be the next step in economic progress. Thru the organization of labor, thru collective bargaining, thru the exertion of such political influence as secured the passage of the Adamson Act, the workers are already taking over a share in business management. Miss Hedges feels that wage work must be for the future more and more monotonous and disconnected; and that the operative's genuine self-realization must come in her leisure hours. Is it not possible that with a wider share in the direction of industry, the detached operations may yet again be gathered into a unified whole in the worker's mind, if not under his hand, and that labor may yet again become self-realization instead of meaningless drudgery? It is the duty of educational institutions to embody this ideal; to react *upon* life as well as *to* life. The operative hand may remain specialized: the unionized, profit sharing, share holding, legislating brain dare not specialize or the progress of industry and government is blocked.

It would be dangerously impertinent for one so out of touch with the latest developments in vocational training to pronounce dogmatically upon the type most likely to succeed in this country; but the continuation school still seems to me the best solution yet offered of our educational difficulty. The trade school can never approximate the rapidly changing conditions of an up-to-date factory; the modern factory can never give the operative the connected view of an industry as a whole which is necessary if trade unions are ever to co-operate intelligently in determining conditions of labor; if popular legislation is to be fair, constructive, and productive of prosperity, and if state and municipal ownership is to become more than a byword for inefficiency. Miss Hedges is undoubtedly right in urging that in the grades we should give the basis for manual dexterity and general intelligence, tho even here her definition of intelligence needs amplification. We have long known that industrial workers left school by the seventh grade. Why should not these workers take with them sound general notions of economic history, of modern industrial process, and modern community problems? The adult studies of today are the juvenile reading of tomorrow. Is it not time that economics and sociology filtered into grade school teaching? Should not the grade school graduate take into the world some knowledge of the forces which will rule his destiny? Are capital and labor, rent, interest, the factory system of manufacture, transportation and commerce, bargaining, the determination of prices and wages, taxation, and government such abstract propositions that the thirteen or fourteen-year-old boy and girl cannot work out in class games, in arithmetic problems, in trips to factories, to farms, to the city market, to the corner grocery, to the department store, the main facts about our industrial organization? This can, this must in some way be accomplished if our American democratic experiment is to succeed. At a time when the duty of large scale, social thinking is thrust upon us, our daily round brings up small scale, fractional experiences. We see life in cross section. The city child seldom sees the whole of any process. He eats the potatoes on the table; he may trace them to the grocery; of the middle man who handles, of the railroad that carries, of the farmer who plants and cultivates them he has has no picture. The "store" is the Alpha and Omega of his economic thinking. The intricate human business of production has no more place in his mind than in the magic tale of *Aladdin and The Wonderful Lamp.* In such a world, for such a city child cut off from the productive process by the distance of the farm and the "No admittance" sign of the factory, the trade school, however poorly articulated with industry, has an immense educational value; and while I am

scarcely more sure than Miss Hedges what form industrial education should assume to meet the new demands of modern life and work, it is with regret that I read a monograph that casts discredit upon the idea of vocational training, which, however imperfect its present technique and however ill adapted to current conditions, at least contains the germ of a reconstructed and glorified society.

That there is a saving crack in the consistency of Miss Hedges' opinion which she and her reviewers have both overlooked is shown by her concluding comment upon the wage record of high school pupils, a record which curiously contradicts the unfavorable inference drawn from the relation of wages to rate of progress in the lower grades. "The summary curves show that the high school girl requires less experience than the girl leaving the lower grades in the grammar school to reach the same wage. With an increased prevalence of technical training in the schools, the next generation of workers, if they can be kept in the schools an increasing length of time, may hope to find their wage increasing while their experience to attain this wage should decrease." Is the investigator not wiser after all than her statistics? And has Miss Hedges really not so much lost her faith in vocational training as recognized fully for the first time the difficulties with which it has to cope?

TWO NEW IDEAS FOR BASKETS

Linwood Taft, Columbia, Mo.

THE objections to making large baskets of reed and raffia have been that the finished baskets were apt to lack firmness, and that the single reed, if fine enough to be easily handled, was hardly in harmony with the size of the basket. If reed coarse enough to be harmonious were used it would be so stiff that only those with unusually strong fingers and forearms could work with it. To obviate these difficulties the following plan has been devised and used successfully for several years.

The basket is started with a single reed in the usual manner (Plate 1, Fig. 1). After three or four rows have been made take another reed of the same size, shave down the end (Fig. 2), cutting back on the lower side at least two inches and cutting the reed down gradually until it is as thin as possible at the end. Place this reed on top of the one already in use (Fig. 3) and make a few stitches over both reeds, taking care to hold them so that the new one will not slip out. At this stage it is well to stick a sharp fine pin, like the black round-headed ones found on every woman's dressing table, down thru the new reed and the one directly beneath it, into the row below (Fig. 4). There will be an inch or so of the pin left sticking up, and it will cause some inconvenience, as the raffia may catch on it, but this annoyance is very slight compared with that of having the new reed slip out after one has worked over it for some distance. After working around as near to the pin as is convenient, it may be removed and there will be no more difficulty experienced.

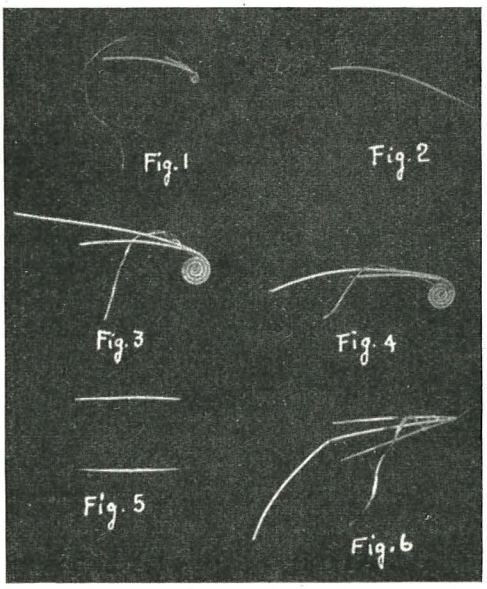


Plate I.

It is better to so plan that both reeds will not need to be pieced at the same time, as that will weaken the basket and may destroy its symmetry.

A basket made in this way is very firm and substantial and has the appearance of having been made over a wide, flat reed. Its great advantage, aside from giving an effect more in harmony with a large basket, is that it allows the greatest possible freedom in shaping the basket. It is possible to get any desired angle and keep it easily, follow any desired curve, and leave a sharp arris where the side is turned up from the bottom.

In case the starting of the second reed is very difficult, make a few more rows with the single reed before starting the second one. The result will not be quite as satisfactory in appearance, probably, as three or four rows with the single reed have proven to be the most satisfactory number, especially in round baskets. Elliptical baskets and trays need a different treatment, which will be described later.

In finishing a basket it is well to cut off the reeds and apparently finish it either one or two rows short of what one intends for the completed basket. Then take two reeds, shave one end of each, place them in

position and begin work near these ends (Plate II) and continue around until the exact length of reed needed to finish the row can be decided. Shave as in joining a new reed only make sure that th y fit onto the ends prepared before starting the row (Plate III) and work up to where the first stitches were taken. If a second row is desired add it in the same way. This gives the basket a more finished appearance than if the original reeds are carried up thru the last row, and it takes a fairly close scrutiny to detect where the ending was made. It is always well to take advantage of the curve in the reed, due to coiling for shipping, as that makes it so much easier to handle and lessens the possibility of lack of symmetry.

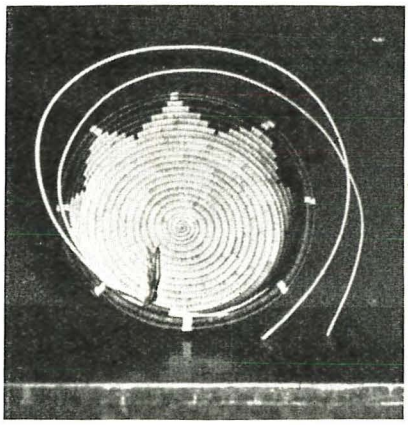


Plate II.

In the round basket shown (Plate IV), four rows were made with a single reed (No. 5) and then eleven rows over the double reeds. This gives a diameter of eight and a half or nine inches for the bottom. To get a symmetrical shape it is necessary to take care to begin turning up for the side exactly opposite the place where the second reed was started.

Two rows on the side were made with the natural raffia and then with pencil marks the last row was divided into eight equal parts. On the next row two stitches of Delft blue were taken over each pencil mark, thus making the beginning of the dull inverted points which form the design. On the next row eight or ten stitches of the blue, as necessary, were taken above each two. When the side was seven rows high a sharp turn was made and another row added. By this time the blue points had widened until there were only four stitches of the natural colored raffia between them. This row was ended as tho the basket were finished and then another row of blue alone was added, as described above. The opening in the top of the basket is ten inches in diameter.

The tray shown (Plate IV) is made in the same way except that being elliptical it was started in a different way. Six inches of a well-soaked reed (No. 5) was bent over, and in making a sharp bend like this it is better to pinch the place where the bend is to come between the jaws of a pair of round-nose pliers. Take two reeds each five inches long and shave both ends as in Plate I, Fig. 5. Place one on each side of the bent reed and with natural colored raffia wind over the middle reed, around one of the outside reeds, under the middle one, and around the other outside one, as in Fig. 6, winding closely enough to cover the middle reed well. Fold the long reed down over this middle and continue as in the round basket. These two short reeds prevent an unsightly curve in the middle of each side of the tray.

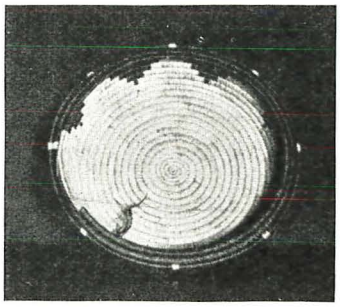


Plate III.

Two rows were made with the single reed and then the second reed was added when turning at the end. Eleven rows with the natural colored raffia were made before the color, nut-brown, was started. The design is very similar to that on the basket but the last row of the bottom was made with the brown alone. The design on the bottom of the tray occupies seven rows. The side was put on one row at a time as described in finishing the round basket. In the second row the two reeds were re-inforced by

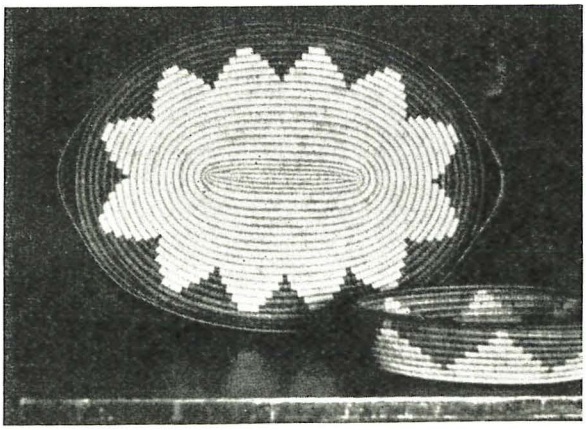


Plate IV.

two more, shaved at both ends, where the handles were made. These re-inforcing reeds are extended far enough on each side of the handles so that they are securely sewed in place. In making the handles the raffia is wound tightly and closely around the four reeds until the handles are long enough and then the reeds are bent in and the sewing is continued.

ORGANIZATION OF TEACHING MATERIAL

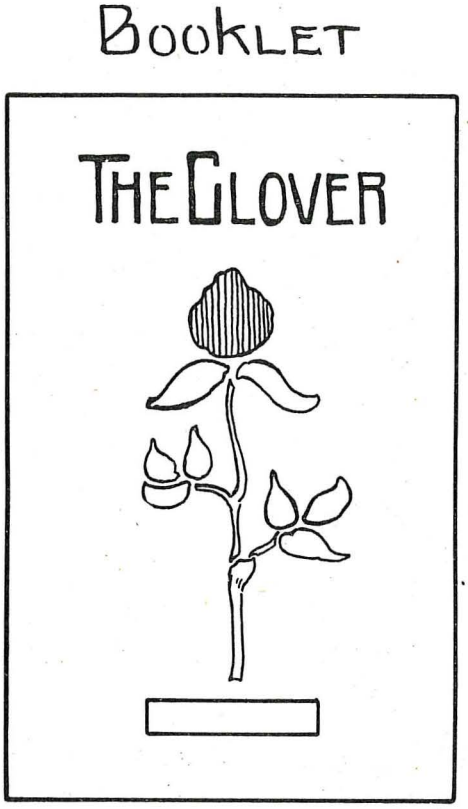
A SUPERVISOR'S OUTLINE—*Concluded*

F. D. Crawshaw, University of Wisconsin, Madison, Wis.

Fifth Grade.

Mechanical—

Subject Matter: Review all polygon forms. Projects made from paper without a true edge. Introduce simple tangents. Assembly dimensioning. First work in two-view drawings. Relation of pattern to working drawing without aid of object. Vertical letters.

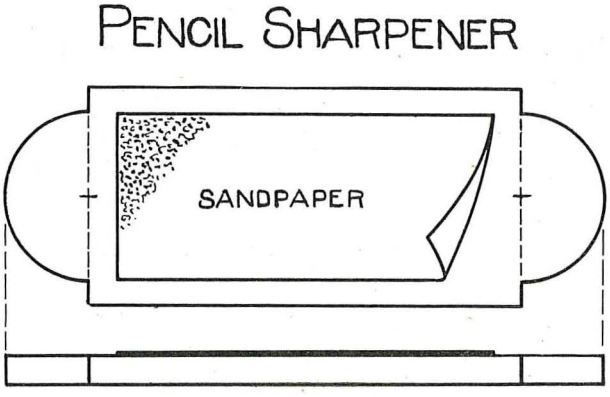


Grade V. Example of Freehand Drawing and Design.

Method: Anatomical study of flower or other unit. Making plan and elevation views to secure conventionalized form. Work in special media to get particular application to same (as flower motive adapted to clay).

Tools: Same as Grade Four.

Models: Objects of clay, leather, textiles, paper, wood and metal emphasizing two dimensions principally (objects in the flat) and lending themselves to balance and rhythm enrichment.



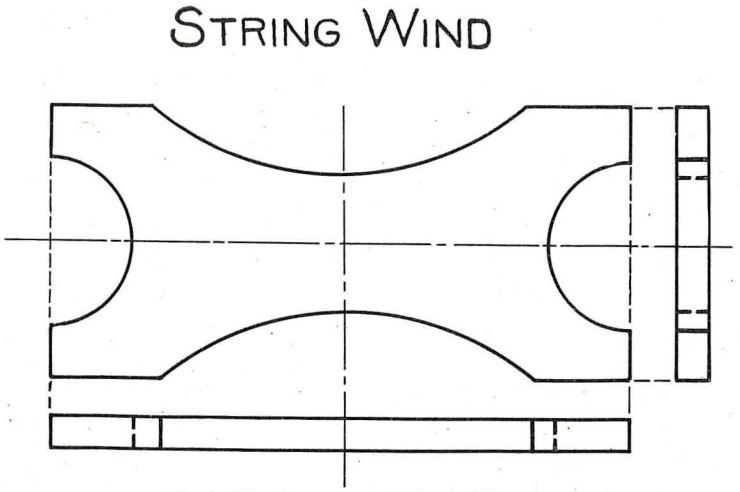
Grade VI. Example of Mechanical Drawing and Design.

Sixth Grade.

Mechanical—

Subject Matter: Working drawings two views or more, of three dimension projects upon drawing pad with use of T-square and triangles. Preliminary working sketches. Detailed dimensioning. Condensed vertical Gothic letters.

Teach: Three-view working sketches and pencil mechanical drawing from object. Form and spacing of letters in a word. Relation of detail to assembly dimensioning. Simple conventions. Objects made up of straight lines and large circles principally.

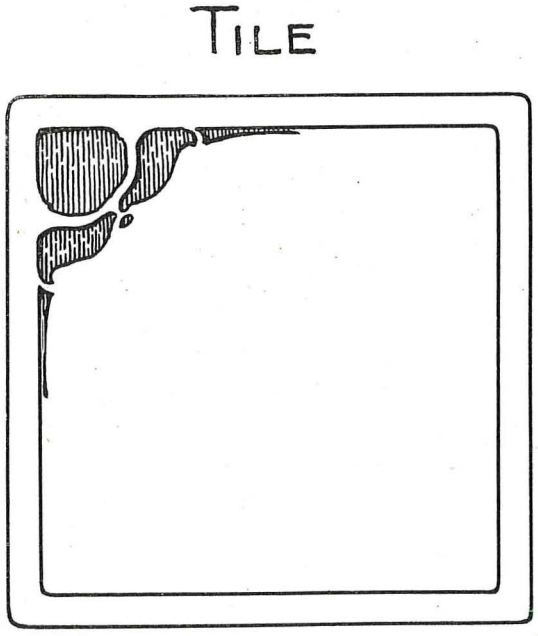


Grade VI. Example of Mechanical Drawing.

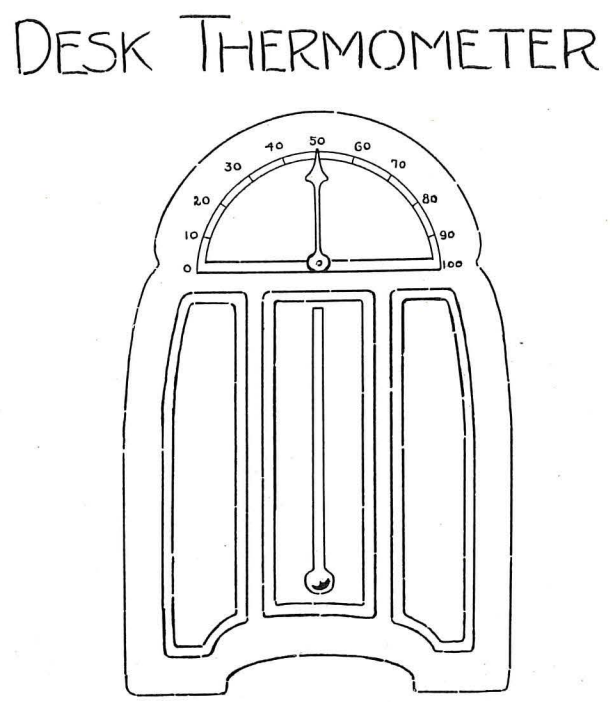
Method: Looking at object to get views. Drawing from object and from dimensioned sketch. Class demonstration and individual assistance. Few similar letters or figures at one time for short period only.

Tools: All mechanical drawing tools except drawing board and set of instruments.

Models: Any project in whatsoever material not having great detail or irregular curves. Projects largely those being made by pupil in construction work.



Grade V Example of Mechanical Drawing and Design.

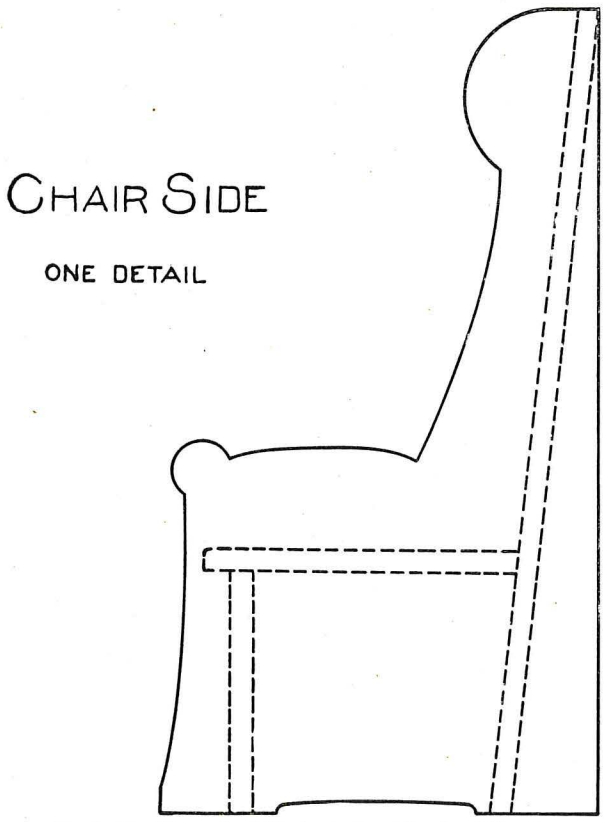


Grade VI. Example of Freehand Drawing and Design.

Freehand and Design—

Subject Matter: Perspective principles—(1) *Foreshortening,* (2) *Convergence,* applied to cylinder and cube preceded by freehand sketches from model. Harmony and unity in design. Simple conventions or "Mechanics of Design."

Teach: Foreshortening and Convergence. Determination of perspective principles and their value in representing three dimensions. Vertical cylinders and ellipses and their relation to the various major and minor axes. Spacing of letters and words in symmetrical group.



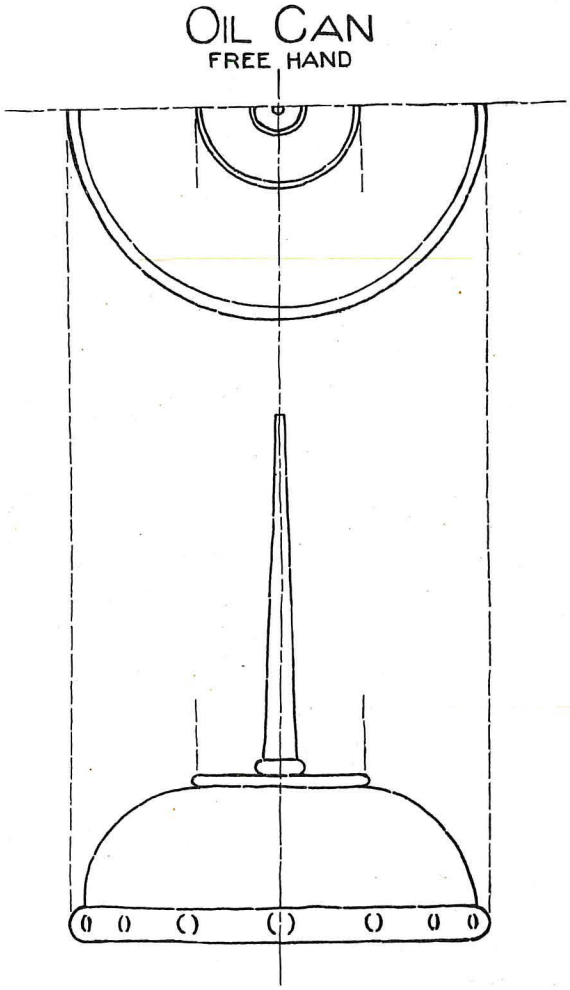
Grade VI. Example of Mechanical and Freehand Drawing.

Method: (1) Looking at the object and testing by various mechanical means to determine convergence and vanishing points. (2) Drawing from objects with extension of lines to indicate convergence. (3) Mechanical perspective drawing of object summarizing in exact terms the perspective knowledge gained. (4) Written statement of rules or principles deduced.

Individual initiative.

Tools: All mechanical drawing tools not including set of instruments, H. B. pencil, pens, water color set.

Models: Cube, cylinder and related objects as books, round basket and low dish forms. Articles having heighth subordinated to width and length.



Grade VII. Example of Freehand Working Sketch

Seventh Grade.

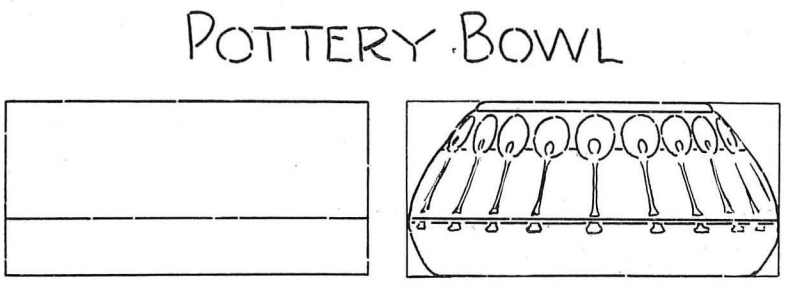
Mechanical—

Subject Matter: Complete working sketches, detail and assembly, of projects involving a few parts. Simple sections and interesections. Shop mechanical drawing, including notes, bills of stock, complete dimensions. Geometrical drawing as applied to shop drawings.

Teach: How to make working sketches from object, perspective sketch and data and how to develop shop mechanical drawings from same using shop conventions. Spacing of words in lettering, notes and titles.

Method: Demonstration and individual instruction. Make problems individual as far as possible. Develop drawings upon following plan: First, those involving straight lines principally; second, those involving straight lines and large circles; 3rd, those involving small circles, arcs and simple tangents. Co-ordinate paper in sketching objects with considerable detail.

Teach: Two-view working drawings with assembly dimensions. Development of project from working sketch



Grade VII. Example of Freehand Drawing and Design.

on blackboard or from dimension data without object but with perspective sketch. Vertical freehand Gothic letters.

Tools: Same as Grade Four.

Method: Viewing object from plan or elevation position. Easiest and most natural means of relating views. Pattern developments from working drawings. Class demonstration and individual assistance. Few similar letters at one time, for short period only.

Models: Paper: Difficult box and envelope forms. Covered waste basket. Portfolios. Case bound books.

Clay: Tiles, low dishes.

Wood: Projects made in whittling, coping saw work or light bench work having small amount of detail and capable of representation by two views.

Freehand and Design—

Subject Matter: Review single bilateral unit and repetition in border, special emphasis upon turning corner. Relation of simple geometrical forms to plan view of natural unit. Vertical lettering. Titles, as space divisions in a design. Relative importance of particular groups of letters in titles. Object drawing of rectangular and curvilinear forms.

Teach: Consecutive measurements. Principle of rhythm in application. Application of conventionalization for special media as: clay, leather, etc. Relation of lettering to bookmaking. Design of book covers.

Tools: All necessary drawing tools including small drawing kit and set of instruments for pencil work.

Models: Any projects of individual or class interest appropriate for detailed working sketches, and not too involved assembly mechanical drawing.

Freehand and Design—

Subject Matter: Study of proportions and space divisions of objects for household service, with their appropriate enrichment.

Teach: How to create a pleasingly proportioned enclosing rectangle for the design of utilitarian objects. How to divide this rectangle horizontally into properly proportioned parts. How to enrich the outline and the surfaces. Special emphasis should be placed upon manual arts and domestic arts shop problems. Lower case Gothic letters for notes.

Method: Class demonstration and individual instruction. Ideals established by visits to local stores. Harmonious and appropriate coloring of design in two analogous hues of different values. Appreciation rather than development of craftsman's skill.

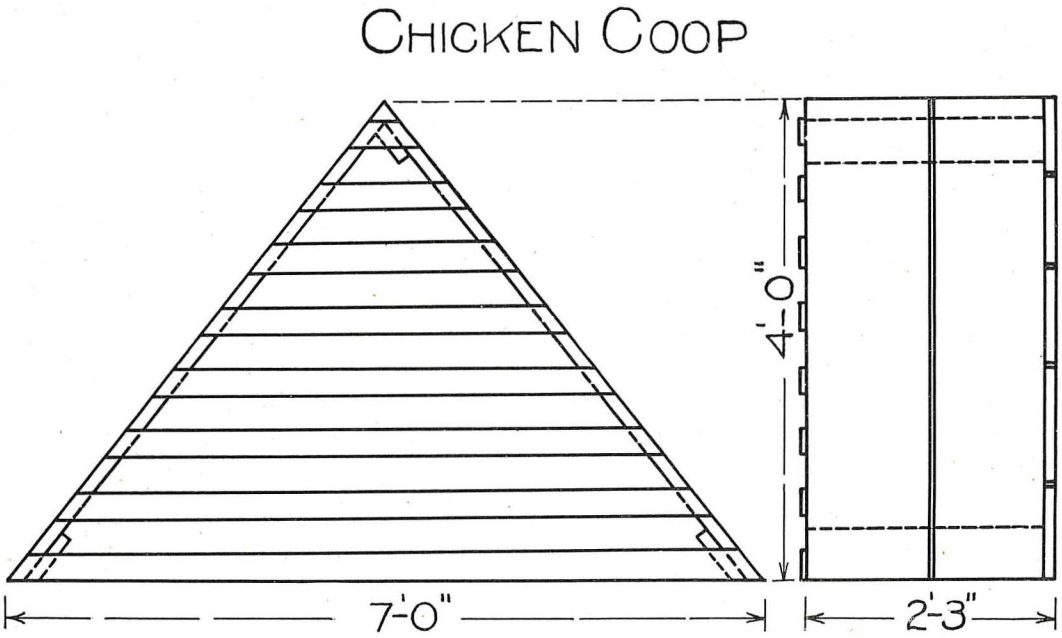
Tools: All necessary drawing tools, instruments, H. B. pencil, tracing paper and color box when necessary.

Models: Vase forms, tumblers, tea pots, foot stools, stenciled pillows and various problems of individual or class interest.

Eighth Grade.

Mechanical—

Subject Matter: All elements in drawing: First, perspective sketch; second, working freehand sketch; third, mechanical drawing. Complete working drawings with good technique in line, letter, figure, and ordinary drawing and shop conventions.

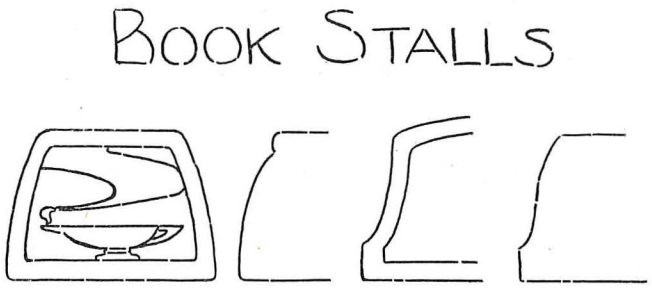


Grade VII. Example of Mechanical Drawing.

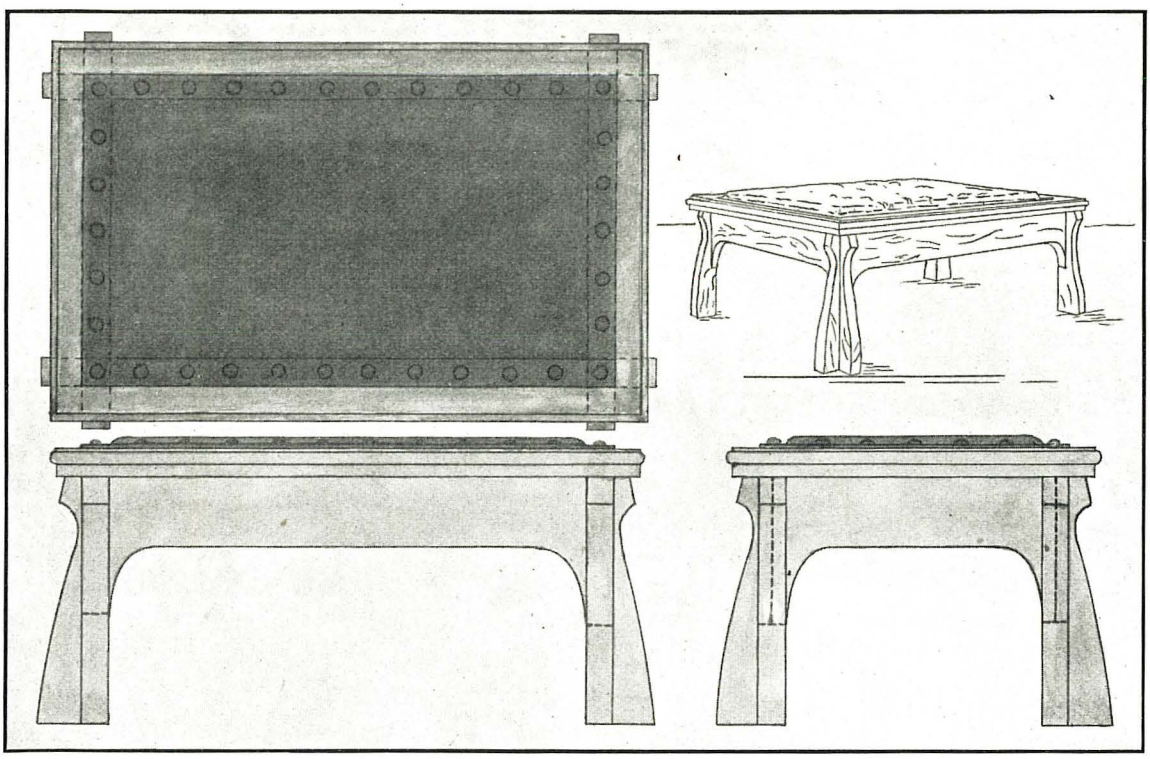
Teach: Combination of all foregoing subject matter in accordance with best commercial drafting room and shop practice possible.

Method: Same as in Grade Seven.

Tools: Same as in Grade Seven.



Grade VIII. Example of Freehand Drawing and Design.



Grade VIII. Example of Mechanical and Freehand Drawing and Design.

Models: Same as in Grade Seven. Note: The time in Grade Eight is to be used to summarize and round out all previous experience in drawing. It is expected that the student when completing the work of Grade Eight will be able to accomplish good results in any ordinary problem in mechanical drawing.

Freehand and Design—

Subject Matter: Review drawing of curvilinear and rectangular objects, perspective principles of foreshortening and convergence, formation of conventionalized front and top views, plant and animal forms adapted from nature, adjustment of the same to one repetition in a border design, subdivision of spaces by vertical and horizontal lines, enrichment of outline and surface related to service. Group sketching in and out-of-doors.

Teach: Actual value of visual representation of an object in three dimensions as a contribution to the enlargement of an individual's vocabulary and efficiency. Value of good design in the industrial world and general cultural value of aesthetic training. Composition.

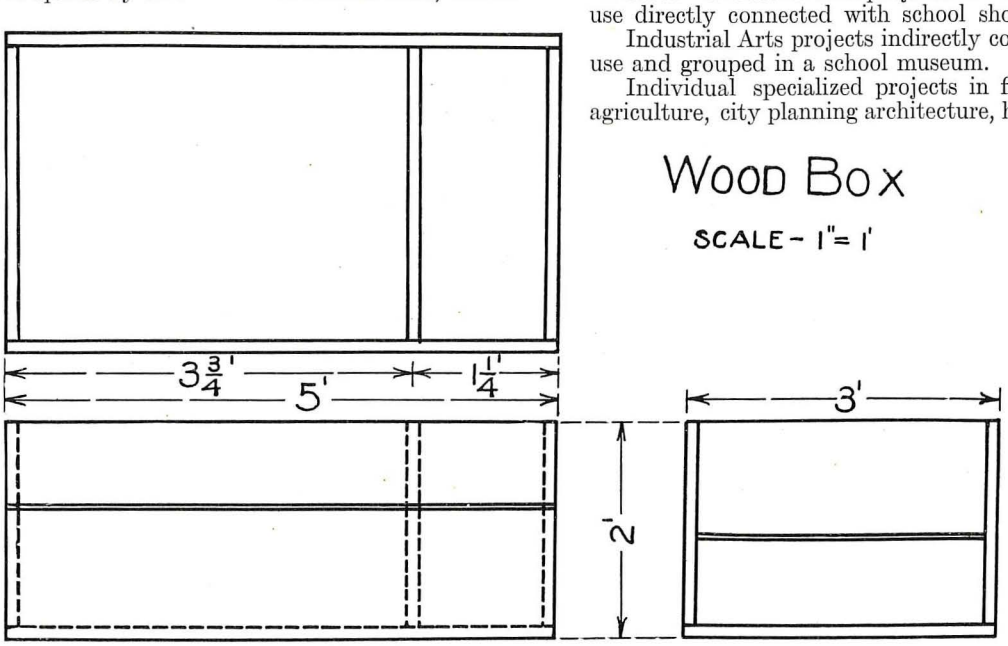
Method: Value of different forms of illustrative material. Consultation of catalogs and articles for public and individual use with the thought of discriminating between good and bad design. Intensive individual practice in refining a design.

Tools: See preceding grade.

Models: Industrial Arts projects for home or community use directly connected with school shopwork.

Industrial Arts projects indirectly connected to school use and grouped in a school museum.

Individual specialized projects in fields of industry: agriculture, city planning architecture, home-making, etc.



Grade VIII. Example of Mechanical Drawing.

PRIMARY CONSTRUCTION

Edward F. Worst, Director of Elementary Manual Training and Construction Work, Chicago

FEBRUARY.

Construction Work for First Grade.

February is the month for the mid-year promotions. All schools, however, do not have two promotions a year. September pupils of the first grade may continue with the advanced first-grade work as outlined. Pupils entering school in February should begin with the work outlined for September. This will include the various kinds of cutting, and the construction of the cutting envelope, envelope for dissected pictures, box for shoe pegs, ruling of peg board and envelope for peg board.

Much of the work relates to the seasons of the year. This might be termed "special." The special work for this month may be based on the February interests, the birthdays of Lincoln and Washington, and St. Valentine's Day.

Cutting.

The freehand cutting for this month should very closely relate to the history for the month. Cut horses, which may be made a part of the great procession of covered wagons (prairie schooners) used in traveling from the east to the west during Lincoln's early life. The horses may be made to stand in pairs by folding a strip of paper $\frac{1}{2}''$ wide and 5″ long into five equal parts. Allow the fifth part to overlap the first, and paste. (Fig. 24.) This makes a square. The horses may be pasted to opposite side of the square, thus making them stand.

The beginners may use the animal, bird, and vegetable sheets as suggested in the September outline. This relates to the Nature work for the spring months.

Trees.

Fold and cut trees as suggested in the November outline. These may be used in building up scenes from the lives of Washington and Lincoln.

Clay.

Model horses. They may be hitched to moving wagons. Model men, women and children, to be placed in wagons. An interesting group problem grows out of this work for the month, thus giving each child in the room an opportunity to take part in making real the great procession of prairie schooners which brought so many people from the east to the west during Lincoln's early life.

Review of Log House.

The log house suggested in the November work may very profitably be reviewed for this month. Use the ruler in measuring the 9″ square in advanced first grades. To the beginners, pass the 9″ square of paper and make the lesson one of folding. Develop the number work as suggested in the folding for "Box for Shoe Pegs" in the September outline.

Covered Wagon (Prairie Schooner).

From a piece of 9″x12″ construction paper, fold a wagon box in the same way that the box for shoe pegs was folded. This makes a box $4\frac{1}{2}''$ long when finished.

Pass to each child a rectangular piece of paper $4\frac{1}{2}''$x6″, and paste one short edge to one side of the box and the other short edge to the opposite side, thus making a covered wagon as shown in Fig. 13.

Provide each pupil with a circle of stiff paper, such as is used in the top of a milk bottle. Use this as a pattern, cut four wheels, and either paste to sides of wagon, or they may be held in place by using the small black collar buttons. With the point of the scissors, make small holes in the sides of the box where the wheels are to be placed. Thru these holes force the small buttons and then thru the center of the wheel.

Small Furniture.

From scraps of paper, have the pupils construct, undirected, small pieces of furniture to load into the prairie schooners. When each child has finished his work, form a procession of all the horses and wagons in the room.

Doll House Furniture (Continued).

Keep this work as simple as possible. Use the ruler in the advanced first grade wherever possible. The beginners should not use the ruler, but simply fold, paste, and cut the squares.

Emphasis on the Use of the Ruler.

So far as possible, each exercise should involve to some extent the use of the ruler. It will be observed that the exercises given in January and those for this month are a combination of measuring and folding.

Badges.

Purpose:

To encourage patriotism.

Material:

Red, white, and blue construction paper.

Presentation:

The appearance of red, white, and blue paper inspires children to do their best. This is the first exercise in which the pupils have been asked to draw a square. In former exercises measurements were marked off on the long edges of the 9″x12″ paper, and the corresponding dots connected by a straight line. The square was produced by cutting on the straight line.

To draw the square: First, draw a one-inch horizontal line. Place the end of the ruler so it coincides with the line just drawn, and draw a one-inch vertical line. Place the end of the ruler so it coincides with the vertical line just drawn, and draw another one-inch horizontal line. Lay the ruler across the ends of the two horizontal lines and connect by a straight line.

Badge: Cut three one-inch squares from red, white, and blue paper. Allow the red square to remain the full size. Holding the blue and white together, cut off, freehand, a strip about $\frac{1}{4}''$ from two sides. Allow the white to remain this size, but from the blue, cut, freehand, another strip about $\frac{1}{2}''$ from two sides. Arrange the squares as shown in Fig. 12. Cut streamers freehand.

Soldier Cap.

Purpose:

To aid in making more real the lives of Washington and Lincoln. To create a live interest in the history for the month.

Material:

One sheet of white paper, 20″x26″. Red, white and blue construction paper.

Presentation:

Pass to each pupil one sheet of paper 20″x26″. Almost any kind of paper may be used for the cap. Plain white is desirable. Place the paper so the long edges are parallel with the front edge of the desk. Fold right and left edges together. Place paper so the creased edge is at the top. Fold right and left edges together. Unfold. Find crease thus formed. Fold upper edge of right half to crease; left half. See Fig. 1. Fold front oblong at bottom upward along front edge of triangle; back oblong upward along back edge of triangle. Fig. 2.

Fold corners down, one over the other. Fig. 3. Fig. 4 shows finished cap. Figs. 5, 6, 7, 8, 9, 10 and 11 show a variety of ways for using red and blue with the white as a decoration.

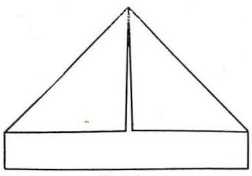


Fig. 1

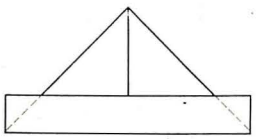


Fig 2

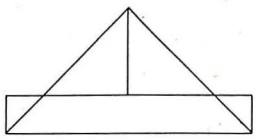


Fig 3

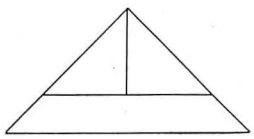


Fig 4

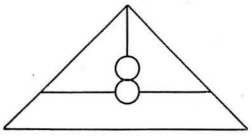


Fig. 5

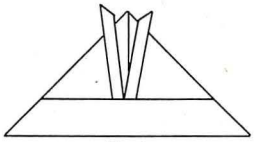


Fig 6

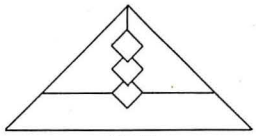


Fig 7

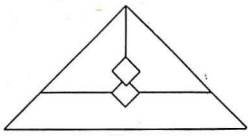


Fig 8

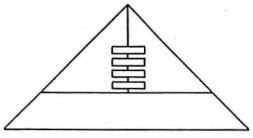


Fig 9

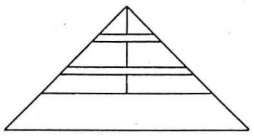


Fig 10

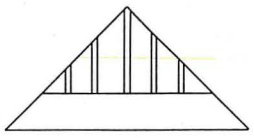


Fig 11

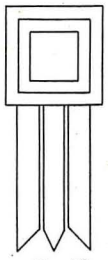


Fig 12

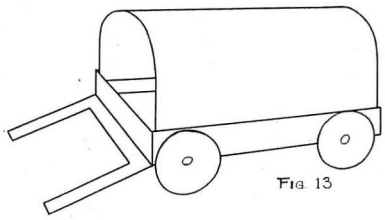


Fig 13

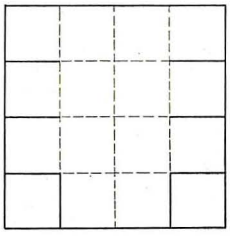


Fig.14

FIRST GRADE.

To Make a Trunk.

Pass to each child a 9″x12″ piece of tinted construction paper. Place the paper so the long edges are parallel with the front edge of the desk. Lay the ruler along the long edges and mark off nine inches. Connect corresponding dots by a straight line. Cut along line just drawn. Fold square as shown in Fig. 14. Cut as indicated by continuous lines. Fold squares into ends as in previous exercise, and paste. Fig. 15 shows finished trunk.

Do not fail to develop (or review) number work in each exercise.

To Make a Cupboard.

Proceed as in the construction of the trunk. Turn finished trunk on end, as shown in Fig. 16. Make two parts of the strips of squares cut away. Fold as shown in Fig. 17, and paste to inside of cupboard, as shown in Fig. 18.

To Make a Dresser.

Measure, cut and fold a 9″ square. Cut as indicated in Fig. 14. Fold and paste as shown in Fig. 19. Pencil marks only suggest drawers. A piece of silver paper or even white paper may be used for mirror.

To Make a Serving Table.

Measure, cut and fold a 9″ square. Cut as shown in Fig. 14. Fold and paste as shown in Fig. 20. The construction of the serving table is the same as the dresser, with a few modifications. Legs are cut, and the back piece is only half as high as in the dresser.

To Make a Stove.

Measure, cut and fold a 9″ square, as in previous exercises. Cut away one row of squares. Fold into box-form. Cut doors and circles freehand from a darker tint of the same paper, and paste to top and sides of stove. Fold and cut one of the small squares into halves. Fold again and paste this to front of stove for hearth. Cut bottom as in Fig. 21.

To make the pipe, roll a piece of tinted construction paper around a lead pencil.

It is thought best to delay the rug weaving for the house another month.

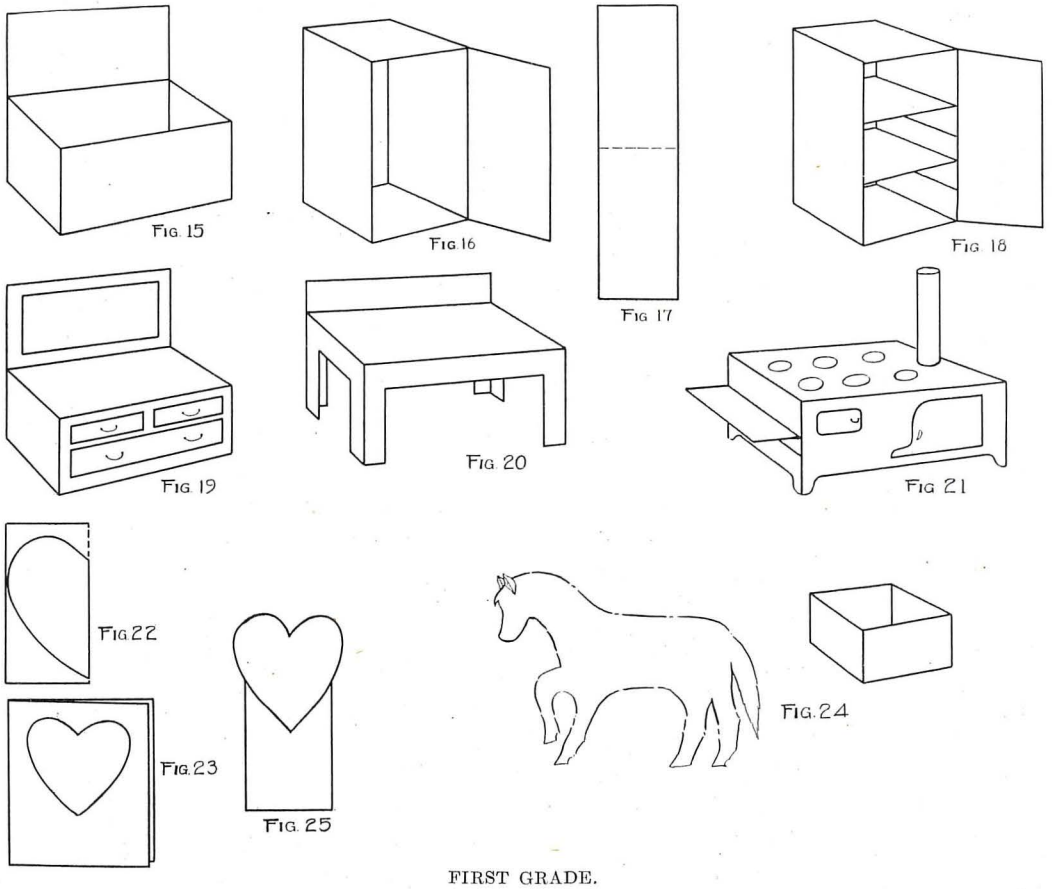
Use only the time allowed this work in the official bulletin on distribution of time. Do all you can in the time alloted. That is all that will be expected.

Valentines.

Very interesting valentines may be cut by folding the paper, one, two or even three times. The folding suggested in December for a picture frame makes an interesting valentine.

Fig. 22 shows the folding and cutting of heart-shaped valentine.

Fig. 23 shows a rectangular piece of paper folded so the short edges come together. A heart is cut from one face. In the under half interesting scrap



FIRST GRADE.

pictures or even pupil's cuttings may be pasted, so as to show in heart opening.

Fig. 25 shows a heart pasted to a doubled rectangular piece of paper. Decorate with cuttings or scrap pictures. When opened it will stand like an easel.

Envelopes.

After a review of envelope making, pass to the pupils manila drawing paper, or tinted construction paper, and have them construct envelopes for their valentines.

Use the suggestions given for envelopes to be made for seat work in previous months.

FEBRUARY.

Construction Work for Second Grade.

Pupils of the beginning second grade may do much of the work as outlined for September.

Purpose: *Cutting and Tearing.*

To aid in doing original work, and to train the mind, hand, and eye to work together. To lead to skill.

Material:

Number paper. Tinted construction paper. Manila drawing, and kraft paper.

Presentation:

Pupils have gained, thru the story and history of the month, numerous ideas concerning the customs and modes of living of the people during the times of Washington and Lincoln. Many of these ideas may be illustrated in the cuttings and tearings.

Folding and Cutting for Valentines.

Very interesting cuttings may be made by first folding the paper, one, two, or even three times and then cutting.

To make a double heart for a valentine, use a piece of white drawing paper 4″x8″. Fold the short edges together, then fold the remaining short edges together, as shown in Fig. 1. Draw a heart shape on the folded square, and cut on the curves, leaving "hinges" as shown. On the inside print a message. Cut a small heart from red paper and paste it in the middle of the outside. For other suggestions see Figs. 23 and 25, First Grade.

Purpose: *Folding for Valentines.*

To gain neatness and accuracy thru interest in valentines,

Material:

A 4″, 5″, or 6″ square of colored paper.

Presentation:

This exercise requires little or no effort on the part of the teacher to work up enthusiasm, for it is already there. For the first folding, furnish each child with a colored square. By careful questioning, get from the children as much number and language as possible. The following are suggestive questions:

What is the shape of your paper?

How many edges has it?

What can you say of their length?

How many corners?

What kind of corners?

Hold paper by two diagonal corners: fold these corners together: what is the shape of your paper now?

How many edges has a triangle? More or less than a square?

How many more has a square?

What kind of corners has the triangle? How many?

Unfold the paper: what part of the square is each triangle?

Hold paper by corners at ends of crease: fold these corners together: unfold: how many triangles are there now? How many times the number of triangles there were before?

What part of the square is each triangle?

Find center of square. Fold upper right corner to center: how many corners has your paper now? Fig. 4.

How many more than a square?

How many more than a triangle?

How many square corners has it?

Fold the lower left corner to the center. Fig. 5. How many edges has your paper now?

How many more than a square?

How many times the number a triangle has?

How many corners?

How many square corners?

Fold the other two corners to the center: (Fig. 6). How many triangles can you see?

What part of the square is each triangle?

Reverse the paper so that the closed side is next to you: Fig. 7. How many squares can you see?

What part of the whole is each square?

Find center of the paper: fold each corner inward to the center. Reverse paper so you are looking at four squares whose loose corners meet at center of paper. Fig. 8. Lift loose corner of upper right square. Fold it back to upper right corner of paper. How many triangles can you see? How many squares? How many more squares than triangles?

Fold other corners in the same manner.

This finishes the simplest kind of formal folding and may be called Folding No. 4. A small picture may be placed in the center, thus making a very interesting valentine.

Modified Foldings.

Fold No. 4 and turn corners downward as shown in Fig. 9. Fold Fig. 9 and then fold points inward, as shown in Fig. 10.

Fold Fig. 10, and instead of folding points under, allow them to fold outward as shown in Fig. 11.

Fold Fig. 11. Turn upward, so that points fold under as shown in Fig. 12.

There is almost an endless number of paper foldings, of which the foregoing are merely suggestions.

Envelopes for Valentines.

This may be simply a folder of tinted construction, made as suggested by the drawing in Fig. 13. Cut on continuous line. Fold on all dotted lines. This makes a square folder.

Cutting Envelope.

For details of construction, see September outline.

Box for Colored Sticks and Use of Game.

See September outline.

Drawing of Squares.

Purpose:

To give pupils an opportunity for accurate drawing of corners (square).

Material:

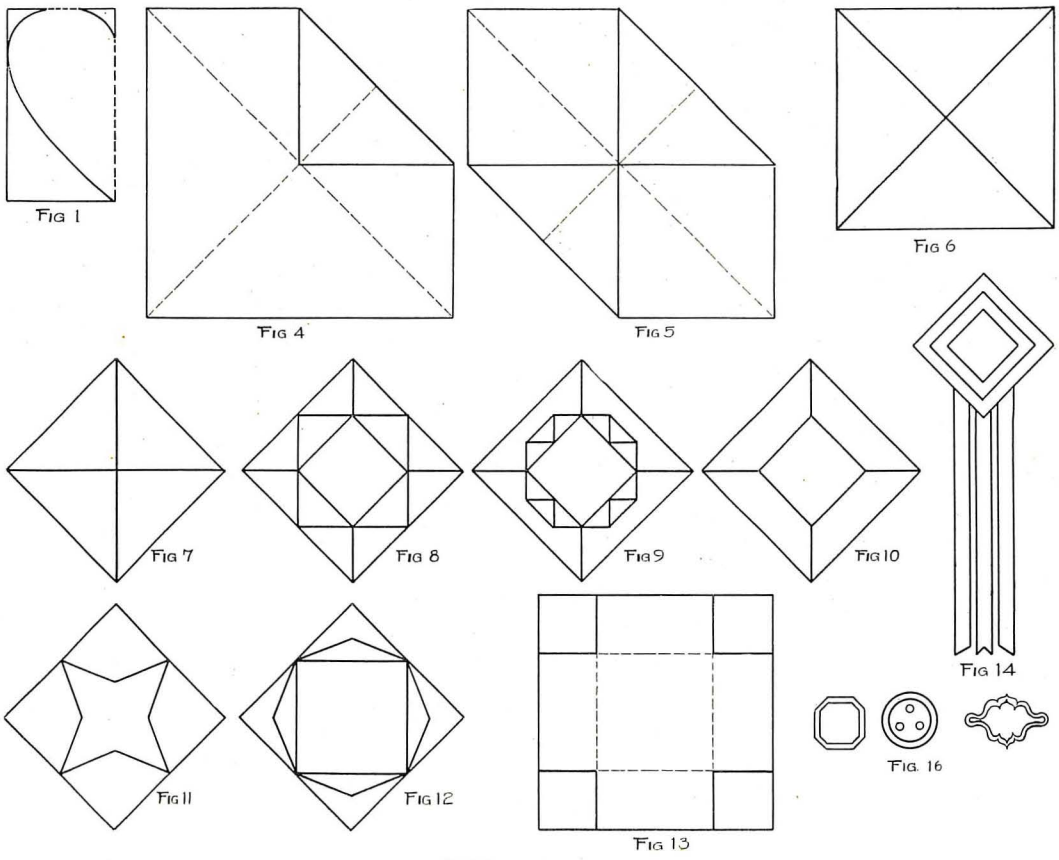
Tinted construction paper.

Presentation:

Pass to each child one sheet of tinted construction paper. Place the following problems on the board:

Draw a 2″ square.

Draw another square twice as long.



SECOND GRADE.

Draw a 6″ square.
Draw another one-half as long.
Draw a 3″ square.
Draw another twice as long.
Draw a 5″ square.
Draw another one-half as long.
Enlarge upon the above.

Divide the 6″ squares into 1″ squares. Do this by placing dots on the right and left edges, and front and back 1″ apart. Connect corresponding dots by straight lines, and cut.

How many squares in one row? In two rows? Three rows? Four rows? Five rows? Six rows?

Cut into 1″ squares.

How many 1″ squares will it take to cover a 4″ square? A 3″ square?

Develop 3 threes and 4 fours.

Reserve the 1″ squares for further use.

Drawing of Oblong.

Draw two oblongs, each 1″x4″.

Draw an oblong 2″x4″.

How many square inches will it take to cover the oblong 2″x4″?

Draw an oblong 3″x6″ (dark brown).

Draw an oblong $2\frac{1}{2}$″x5″ (tan).

Valentines.

To make valentine, use the 3″x6″ and $2\frac{1}{2}$″x$5\frac{1}{2}$″ oblongs cut from the brown and tan construction paper in the previous lesson.

Fold the oblongs into halves by bringing the short edges together. Place the tan within the brown, and tie at the back with any kind of twine (candle wicking is a very attractive material for this).

Place a message on the inside.

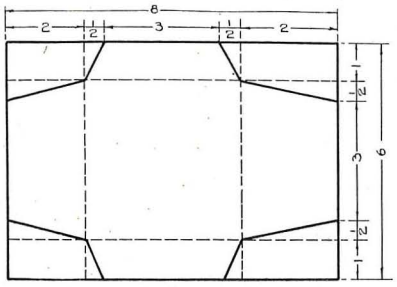


FIG 15

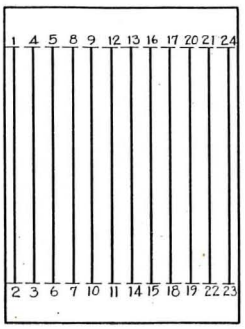


FIG 17

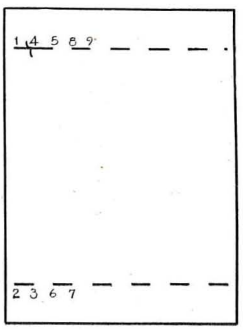


FIG 18

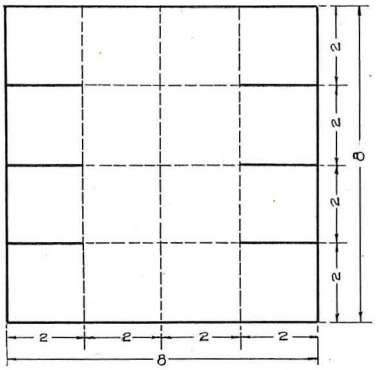


FIG 19

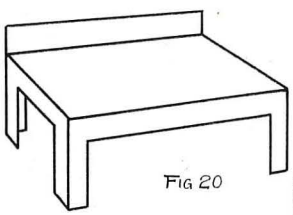


FIG 20


FIG 21

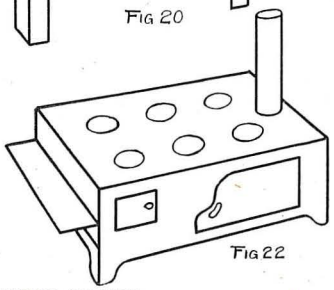


FIG 22

SECOND GRADE.

Badges.

The badges are constructed for the pupils to wear on the birthdays of Lincoln and Washington. They may be used again on Decoration Day.

Purpose:

To arouse patriotism.

To aid in interesting pupils in the history for the month.

Material:

Red, white, and blue tinted construction paper. (Any kind of white paper will answer the purpose).

Presentation:

Have the pupils cut from red paper a $1\frac{1}{2}$″ square, a 1″ square of white paper, and a $\frac{1}{2}$″ square of blue paper.

Cut streamers $\frac{1}{2}$″x4″, one of each of the above colors. Arrange as shown in Fig. 14.

Folder for Valentine.

Develop with the class the construction for a folder. Do this by a series of questions similar to the following:

The valentine is a 3″ square: how long must the folder be when finished? How wide must it be?

When making the folder, it is not necessary to have the side flaps overlap when folded to center.

How long must the side flaps be in order to meet at center of folder (Fig. 13)?

The flap above and the one below must overlap. By making each two inches wide, the valentine is held very securely within the folder. Very interesting seals may be cut of the tan paper and pasted to keep the folder closed. Fig. 16.

Raffia Mat.

To interest the pupils in woven fabrics.

To give them an idea how matting is made. The use of machinery is emphasized.

To lead them to see that, from a sanitary point of view, matting is better than carpet because the smooth finish prevents dirt accumulating; and that matting may be washed without injuring it.

To teach the pupils the value of a handmade article.

Pieces of strawboard 6″x8″ (from strawboard boxes will do).

Carpet warp, to be used in threading the loom.

Raffia to be used for the woof.

Place the 6″x8″ piece of paper so the short edges are parallel with the front edge of the desk. Draw lines one inch from the short edges acoss the paper. On these lines, mark off spaces of $\frac{1}{2}$″. If $\frac{1}{4}$″ spaces are desired, place a dot between each of the $\frac{1}{2}$″ dots. This may be done without the ruler. Pierce the cardboard at each dot.

To thread the loom, see Fig. 17. Come up thru 1, leaving an end. Down thru 2, up 3, down 4. With the end left, and the thread in the needle, tie a hard knot close to 4. Come up 5 and down 6. Continue in this way until the loom is threaded. When finished, the upper side of the loom looks like Fig. 17. The under side looks like Fig. 18. In order to keep the two outside threads from drawing to the center, stitch over them in several places, as shown in Fig. 17.

Serving Table.

Pass to each child an 8″ square of tinted construction paper of the desired color. On the right and left edges place dots 2″ apart, and connect corresponding dots by straight lines. On the front and back edges and 2″ from the corners, place dots. Connect corresponding dots by straight lines. Cut along continuous lines and fold on dotted lines. Fig. 19. Fold, paste, and cut as shown in Fig. 20.

Sideboard.

Pass to each child an 8″ square. Make a pattern drawing as in Fig. 19. Cut, fold and paste, as shown in Fig. 21.

Stove.

Cut an 8″ square from a 9″x12″ sheet of tinted construction paper. Place dots along the right and left edges 2″ apart. Connect corresponding dots by straight lines. Place dots along front and back edges 2″ apart. Connect corresponding dots by straight lines. Cut away one row of squares. Cut and paste into box form. Cut feet as shown in Fig. 22.

Fold one of the extra squares in halves and paste to front of stove for hearth. See Fig. 22. Cut circles of another tint of same colored paper, and paste to top. Cut doors freehand, same color as circles, and paste to side. Fig. 22.

Material for one second grade:

1 pkg. each 6″x9″ tinted construction paper, red, white, blue.

2 pkgs. 9″x12″ construction paper (valentines).

2 pkgs. 9″x12″ construction paper (envelopes for valentines and cutting envelopes).

50 pieces of strawboard 6″x8″.

1 spool of carpet warp.

2 lbs. raffia.

2 pkgs. darning needles (one set for two rooms).

FEBRUARY.

Construction Work for Third Grade.

The third-grade work for the past two months has been heavy. It is, therefore, desirable to make the work for February somewhat lighter, thus giving teachers and pupils an opportunity to catch up on back work.

Valentines.

A blackboard exercise on the drawing of rectangles should precede the construction of valentines.

Material:

Tinted construction paper.

Using tints of the same color, draw three rectangles—brown 3″x8″; (tan) $2\frac{1}{2}$″x$7\frac{1}{2}$″; (brown) 2″x7″.

Fold each into halves by bringing the short edges together. Place one within the other and tie at back with any kind of twine, harmonious in color. See Fig. 1.

On inside, write some little message.

Envelope for Valentine.

Since the pupils have already constructed a number of envelopes, it might be well to pass to each pupil the material required for the construction of an envelope which will be large enough for the valentine just made.

Circular Valentine.

If the pupils have never used a circle maker, follow the directions given in the December outline on Circle Maker.

Blackboard Exercises.

Draw a 4″ circle.
Draw a 3″ circle.
Draw a 5″ circle.
Draw a 4″ square.
From center of 4″ square, inscribe a $3\frac{1}{2}$″ circle.

Valentine.

Use tints of the same color of construction paper. Draw a rectangle 4″x8″. Fold into halves by bringing the short edges together. Find center of square by drawing a part of the diagonals as shown in Fig. 2. Place the folded edge to the left. One-quarter inch to the left of the center, place a dot. Using this dot as a center, draw a circle with a radius one-half the length of the square. In this case it is $\frac{1}{2}$ of 4. The circle extends beyond the square as shown in Fig. 4.

When cutting the circle, cut only that part of the circumference within the square, as shown in Fig. 5.

Draw a rectangle $3\frac{1}{2}$″x$7\frac{1}{2}$″. Fold into halves by bringing the two short edges together. Place the closed edge to the left. Find center of square, and place a dot $\frac{1}{4}$″ to the left. Using this dot as a center, draw a circle, using a radius one-half the length of the square. Cut as in previous exercise.

The two halves are hinged in each case. Place one within the other, and tie at back with any kind of twine.

Construct Envelope for Circular Valentine.

This may be a square envelope made of kraft or tinted construction paper.

Lincoln and Washington Badge.

Purpose:

To interest the pupils in the history for the month.

To encourage patriotism.

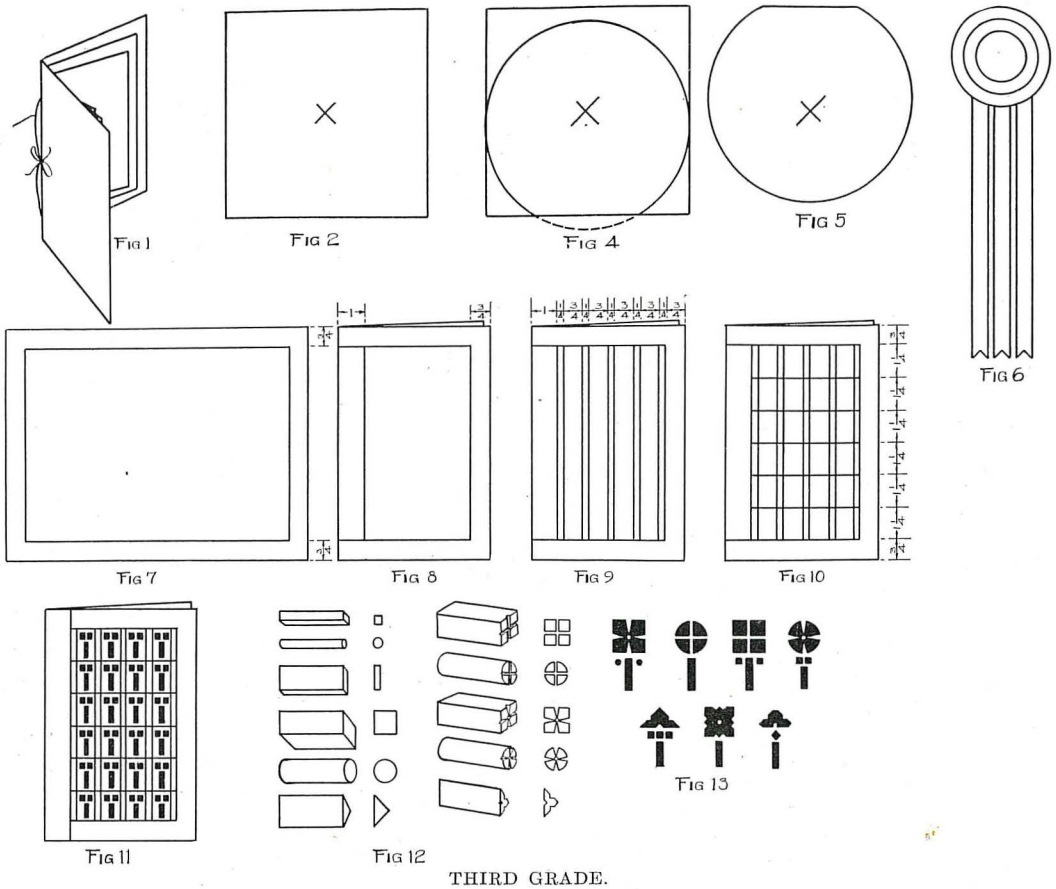
To add interest in the work on circles.

Material:

Red, white, and blue paper.

Presentation:

Draw a $1\frac{1}{2}$″ circle of red; a 1″ circle of white; and a $\frac{1}{2}$″ circle of blue.



THIRD GRADE.

Draw and cut three streamers of red, white and blue paper, $\frac{1}{2}''$x4$''$, and arrange as shown in Fig. 6.

Decorated Spelling Book.

This is nothing more than a single section book sewed so the knot is on the inside. The sewing has been described in previous exercises.

The book is made of 8$''$x10$''$ unruled white language paper or it may be made of 9$''$x12$''$ manila drawing paper with one sheet of 9$''$x12$''$ tinted construction paper used for the cover.

To make the cover:

First allow for a $\frac{3}{4}''$ margin around the 9$''$x12$''$ piece of construction paper, Fig. 7. The sheet is now folded into halves by folding the short edges together as shown in Fig. 8. So far as possible this exercise will be kept in quarter-inch measurements. One inch from the center crease draw a line on each side of the cover. One-quarter inch from this line draw another. Three-quarters of an inch from the last line drawn, draw another. Continue in this way until the margin line is reached, Fig. 9. On the vertical margin lines place dots $1\frac{1}{4}''$ apart and connect corresponding dots as shown in Fig. 10. By making use of stick printing the rectangular spaces may be printed as shown in Fig. 11. The cover is now finished.

The inside leaves may now be folded in halves and placed inside the cover. The book is now sewed, cover and all. A strip of bookbinder's cloth, two and one-quarter inches wide and nine inches long, is creased down the center lengthwise. Paste is applied and it is pasted down the back of the book as shown in Fig. 11.

The book is now placed into the book press and left for a couple of days. After being thoroly pressed it is trimmed, this reducing the margin just a little. Fig. 12 shows a few of the different shaped sticks which may be used in the stick printing. The modified forms are produced by using a three-cornered file. The depressions in the center are made by using a ten-penny nail and a hammer. The head of the nail is placed next to the surface of the block, and the point which is upward given several taps of the hammer. Fig 13 shows a few of the points made after the filing.

The school is not answerable for the native ability of the child; no one expects it to transform the child with little capacity into a scholar, but it is charged with the responsibility of giving him an opportunity to develop to the highest degree any talent which he may possess, provided of course that such talent may be desirable and of practical use to society.

Edwin R. Snyder, California.

Development of Water Colors in Primary Grades

LANDSCAPE

Martin F. Gleason, Supervisor of Art and Construction, Joliet, Ill.

Fifth Article

THERE are two great elements in pictures—the story involved, and the way in which this story is told. This statement applies to the work of children as it does to the work of mature artists. In many lines of drawing in elementary schools the story side of the picture is easily kept very simple and well within the limits of the technique of the children who are asked to tell the story. A bit of plant life—a flower, a specimen of fruit, may be made very simple before it is put before children to work from. When we do our planning, in the work under consideration at the present time, we have a much more difficult problem on our hands. Nature, with her fields and hills variegated in form and color, her skies, light and feathery, and her trees with their outstretched branches and massive trunks, presents to primary children a very big problem, indeed, for interpretation. The magnitude of this problem suggests, in a very forceful manner, that much careful and systematic planning is needed, if we are going to get the most out of the work about to be taken up.

There is no place in all our drawing work, perhaps, where we need to give children methods and tricks of interpretation as we do when landscape is introduced. Neither is there any line of work which presents so many fine opportunities for working in color and developing the ability of the child to handle water colors as a medium of expression. Water color is by far the best medium to use in landscape work. This medium, upon a moist paper, and a skillfully handled brush, will do much toward producing results, pleasing to children, and seemingly worth while in the estimation of the teacher.

As in other lines of work, there are certain phases of landscape work which cannot bed one in certain grades. Much care should be exercised in planning in order to avoid placing too great a task before young children. Poor results will be discouraging to children and careless methods of work will leave nothing but bad habits. There are enough points which may be taught even in first grade to make their teaching worth while. A few more may be added in second grade and so on up thru the school life of the child, adding little by little as we do in other subjects, giving some idea of landscape, some ability to do landscape, and, let us hope, a good deal of love for the work.

There are many who feel that unless the child is left free to express what he sees in landscape, the first great value is lost. To those who have had occasion to see young children work in landscape, it is very evident that a sort of conventional form is used by each individual child and, in most cases, if the child is left to himself, the landscape remains this one conventional kind—a sky, a piece of land, a tree—nearly always put together in the same way. This fact goes to prove that unless the child is led into landscape he never gets very far in the work.

In theory, we would send children out into the open to observe and then come back to paint or draw. The "open" is immense in size and "make-up" and these children who are sent to observe are overcome by this magnitude. It is somewhat like throwing second-grade children into Shakespeare. They are bewildered and know not what to put into pictures, nor how to put in what they might choose as suitable.

Showing and dictating, to a certain extent in this line of work, are to be encouraged among primary teachers. It gives children experience and ability to render, which may be of value in work of the future. If they are following dictation and gathering power to express themselves, they are undergoing a mental development of value. Browning says:

> We're made so that we love
> First when we see them painted,
> things we have passed
> Perhaps a hundred times nor cared to see,

and so the child is introduced to facts and fancies which perhaps he never would have seen for himself and thereby his life is made richer and more complete in happiness. By no means, is this discussion advocating a disregard of the observance of nature—quite the contrary. Nature is so intricate in her "make-up" that we have to learn to know her by studying one small part at a time—her skies this time—her fields and hills and their color another time—the way her trees stretch their branches across the sky another time and so on until we have brought nature as found in landscape, and the children into more intimate acquaintance. A child loves to succeed and any skill which we may help him develop will mean much to his success. Do not hesitate to do anything which will make your little people more capable in seeing and executing.

In the hope that suggestions for developing this subject with young children may be made as clear as possible, they will be taken up step by step and assigned to the grade in which it seems possible to carry them out.

Grade I.

Most landscape work should be done on a moist paper. This condition of the paper will do much toward producing soft color and good edges in land

spaces and tree spaces. The article previously given on flat washes will be of value in showing how to wash in good skies. The same careful method of applying color, suggested in that article, should be used as much as possible.

As a beginning exercise a flat wash of blue may be put on a piece of paper $4\frac{1}{2}''$x6$''$ in size. Yellow may be put into part of this blue to produce the land space or grass. The yellow should be worked into the blue with good simple brush strokes, while the blue is still moist. Children may pick up many points of composition as they go along if teachers will take the trouble to point them out when the opportunity to do so presents itself. When putting in color for the land space we may suggest the unequal division of the picture space by having more or less land than sky. Figures 1 and 4, Plate XXIX, illustrate this step.

An exercise somewhat similar to the one just described may be introduced next. Have the children begin at the top of the paper to put on a flat wash of blue, using a good deal of color at the beginning. With very wet brushes have them bring down a little of this color toward the lower edge of the sky space. It will not be necessary to take any color from the box if enough is used at the top of this space. This process will leave the lower part of the sky very much lighter in value and give a feeling of distance. Yellow and blue may be taken up in the brush at the same time and applied to the paper to give the color of the land. The streaking of yellow and blue which will result from this should not be found fault with as this effect will add to the attractiveness and realism of the picture. Figures 2 and 3, Plate XXIX, show results of this process.

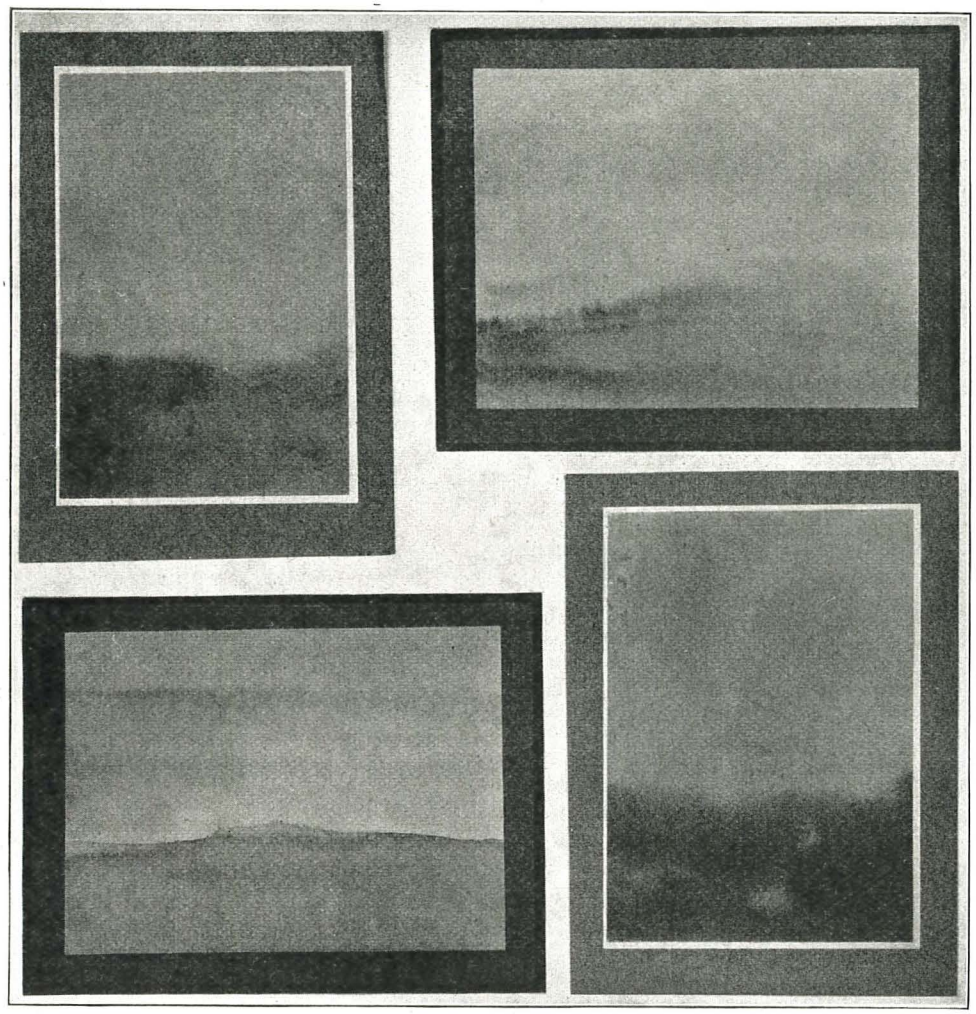


Plate XXIX.

Top Row—Figs. 1 and 2. Bottom Row—Figs. 3 and 4.

In another lesson the sky may be painted in as suggested in the preceding paragraph. The land may be painted in with yellow and then with blue or vice versa. Very often this method may be found instrumental in obtaining a desirable depth of color. It is understood, of course, that one wash is to be painted into another while the first is still quite moist.

The first landscapes, no doubt, should be those which show land bounded by a somewhat straight or level horizon line, such as are shown in Plate XXIX. A little variety may be brought about by

suggesting the painting of hills, sloping in from the right or the left of the picture. When two hills are used, one sloping from the right and one from the left, they should come together away from the middle of the picture. Give children the experience of doing this work with hills and it will add something to their power to compose landscape. Figures 1 and 2, Plate XXX, show work of first-grade children to illustrate what is given in this paragraph.

Rendering of distant trees and foliage of various kinds is not too difficult for first-grade children to handle. It is somewhat more difficult than the work previously suggested but if we are willing to spend the time and energy necessary to do some developing and demonstrating, we will have pleasing and worth while results. The composition, too, is much improved by the introduction of an irregular mass of foliage across the horizon line.

This part of landscape development needs slightly different treatment than did the first few steps. The smooth side of the paper should be wet very thoroly and then turned down on the desks, leaving the rough side up. The part of the side to be used for the sky should be moistened, leaving the land space untouched and dry, excepting for the water put on the under side of the paper. A sky should now be painted in as suggested in previous exercises. When this is finished, the picture is ready for the addition of distant foliage.

There are various ways of rendering this foliage and, of course, any way that is simple enough for young children to handle and will bring results, is a good way. Since this foliage is supposed to be in the far distance it is very necessary that the edges of the tree tops be soft and rather indistinct. This effect can be obtained only while the sky space is quite moist and the color for the trees should be painted in against the lower portion of the sky while the paper is in this condition. The shape of the brush and its simple, systematic handling will do much for the color and the shapes of the distant trees.

Yellow and blue, or the three primary colors, may be taken up on the brush at one time. Then the brush should be laid flat against the lower part of the sky at the left-hand side of the paper, so that it will leave a brush mark running perpendicular to the land space. Such a spot of color laid on the wet surface will spread out slightly, suggesting something of the shape and character of trees in the distance.

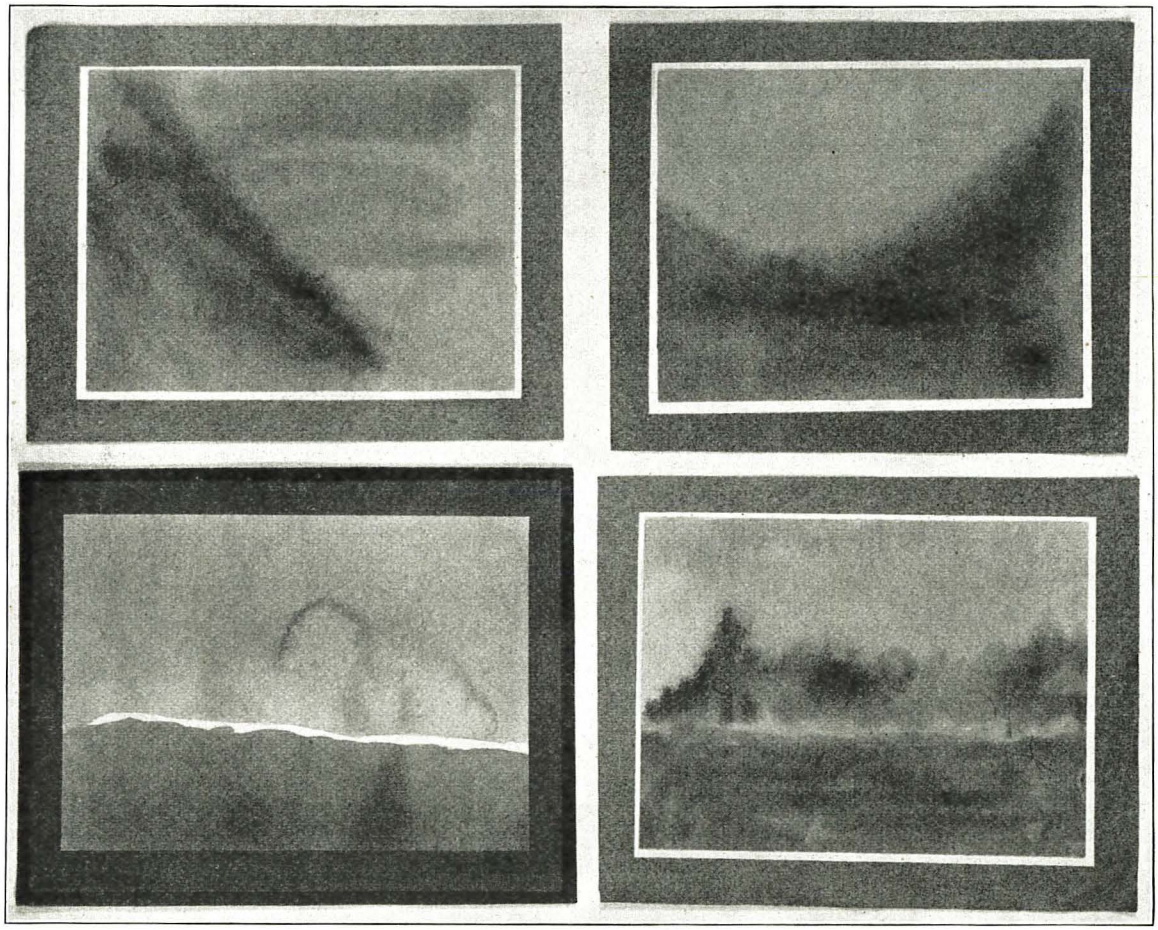


Plate XXX.
Top Row—Figs. 1 and 2. Bottom Row—Figs. 3 and 4.

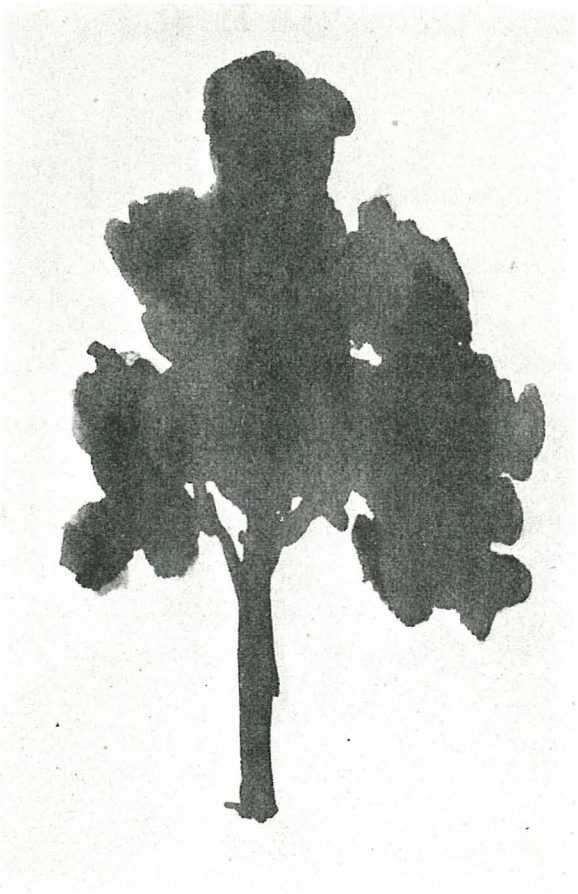


Plate XXXI. Fig. 1.

This process may be repeated across the paper or part way across as desired, by taking up more color in the brush, as the first supply becomes exhausted. Variety may be obtained by varying the height of the trees or bushes. This may be done by occasionally placing the brush higher up in the sky space. Occasionally darker color may be added to the lower part of the mass, thereby adding a little touch of realism.

When this mass is added to the picture, it is necessary to exercise great care to prevent the color used here and the color of the land from running together, thereby destroying the characteristics of both. Much of this may be avoided by the use of a narrow line between the two masses. When first-grade children first begin to use this line it is left very wide and conspicuous, but a little encouragement and wise direction will bring them to the place where they will produce such effects as shown in Figures 3 and 4, Plate XXX. This plate shows reproductions of the work of first-grade children. Fig. 3 shows a line that is too wide.

Very young children, with little experience in water color handling, cannot paint good trees into a landscape. They are unable to control the color while the paper is moist and if they put them in after the paper has dried they seem pasted on and, as water color technique, this is wrong. Little landscape, without trees, such as these young children can do is attractive to them and should be to us. Also, there are enough points valuable and interesting to be developed, without attempting to develop those beyond the ability of the people with whom we are working.

Some people may feel that such a method of procedure takes away the possibilities of doing illustrative work involving trees. Other mediums—charcoal, crayons, paper cutting and tearing—make it possible to use trees whenever it seems desirable. In these mediums children may do trees in landscape in the proper way or as nearly as it is possible for young children to do.

Trees may and should be painted by beginners as a preparation for landscape work to come. They may be painted in over wet spaces as in Fig. 1, Plate XXXI. This method is apt to produce very solid foliage. This defect may be avoided to some extent when the shapes are painted with well-filled brushes on dry paper. Open spaces thru which the sky might be seen should be left, breaking up the edges of the tree shapes. Some of these may be left in the body of the foliage. Children like to think of these as "sky windows." These are very helpful in expressing the character of trees.

There is a tendency, among inexperienced teachers, toward the use of black paint in tree trunks and branches. This is not a desirable tendency for various reasons, chief among which is the fact that tree trunks and branches are not black. Red and blue, with a slight touch of yellow taken up in the brush at one time produces pleasing color, and as near nature's color as is desirable. Black is scarcely ever as valuable as we think it is and its use should be discouraged. Never use it to make distant foliage.

The things a child can make may small and worthless be,
It is his impulse to create should gladden thee.

Froebel.

Manual Training in a Hundred High Schools

Leonard V. Koos, University of Washington

AS implied in its title this article presents the facts of practice in what is included under the name of Manual Training in a hundred high schools. The aspects investigated concern the extent and nature of the offering in this field, the larger aspects of method, and the aims that dominate the work. The materials were gathered by questionnaire* and were supplied by heads of departments or teachers of the subject who had been previously designated by their principals as being "constructively interested in the development of effective courses of study and markedly successful in bringing their plans to realization." The high schools from which the replies have come—and they include institutions in communities of a wide range of population, from village to metropolis—are all on the accredited list of the North Central Association of Colleges and Secondary Schools and are distributed by states as follows: Colorado, 2; Illinois, 22; Indiana, 7; Iowa, 5; Kansas, 10; Michigan, 4; Minnesota, 12; Missouri, 8; Nebraska, 5; North Dakota, 5; Ohio, 6; Oklahoma, 4; South Dakota, 3; Wisconsin, 7. The facts are presented here without critical comment except as they themselves constitute criticism.

I. THE OFFERING AND ITS ORGANIZATION.

Extent of the Offering in Number of Year-Courses.

The number of year-courses reported by teachers of Manual Training is indicated in Table I. The term "year-course" is here understood as signifying a course extending thru a school year without regard to its time allotment per week. This time allotment will be reported below.

Table I.

Number of Year-Courses Offered in Shop Work, Mechanical Drawing, and Architectural Drawing.

Number of Year-Courses.	Number of Schools Reporting. Shop Work.	Mechanical Drawing.	Architectural Drawing.
0	..	1	22
1	6	20	28
2	32	27	14
3	23	19	2
$3\frac{1}{2}$	2	..	..
4	30	27	2
5	2	..	..
6	2	..	..
$7\frac{1}{2}$	1	..	..
No Answer	2	6	32
Total	100	100	100

The offerings in Shop Work are seen to range from 1 to $7\frac{1}{2}$ year-courses with the model practices at 2, 3, and 4. The number of year-courses in Mechanical Drawing, exclusive of Architectural Drawing, is fairly evenly divided among the four practices of 1, 2, 3, and 4. The offering in Architectural Drawing is seen to extend in 28 schools thru a single year and in half this number thru two years. Courses in this subdivision of the work seldom extend beyond the latter amount. Such schools as do not answer may be safely included with those reporting no courses: more than half the schools may thus be said to make no offering in Architectural Drawing.

Years of Appearance of Courses and Nature of Offering.

One aim of the inquiry was to discover the constituency of each of the year-courses, so as to find what distinctions obtain between the more elementary and the advanced courses. Incidentally, we have learned also in what years the work appears.

Shopwork. Woodwork is reported as the sole constituent of the first-year course in Shop Work in 60 to 100 schools. It is reported as a partial constituent in combination with other kinds of Shop Work in nine additional schools. In the remaining 29 schools that answer the question, some differentiated form of Shop Work is reported, usually cabinetmaking, joinery, woodturning, or patternmaking, as sole or partial constituents, altho each of the following is reported once or twice each: woodfinishing, forge work, foundry, sheetmetal work, concreting, electrical work, millwrighting, and printing.

Undifferentiated woodwork is reported in but nineteen of the 92 schools as the sole constituent and in but four schools as the partial constituent of second-year courses in Shop Work. Correspondingly, the representation of the differentiated courses increases. This is true not only of differentiated types of work in wood, already named as appearing in first year, with carpentry in addition, but of work in metal also, as forging, molding, sheetmetal work, and machineshop work. Concreting and printing also continue to appear in a very few instances.

In but three instances each of the 60 schools making answer are third and fourth-year courses in Shop Work constituted solely of undifferentiated woodwork, and it is reported as the partial constituent in but three additional schools for either of these years. Correspondingly the differentiations reported in the second year increase in proportionate representations. This is especially true of the various kinds of work in metal. Machineshop work appears as the sole constituent in a third of the fourth-year courses reported. Carpentry is reported somewhat more frequently than in earlier courses. One school each reports millwork and a special course in autobiles in fourth year.

*The writer acknowledges the assistance of the following persons in framing the questionnaire: Professor Frank M. Leavitt, University of Chicago; Henry E. Brown, Principal of the New Trier Township High School, Kenilworth, Ill.; E. M. Filbey, University High School, Chicago; Clay C. Curran, Lead, S. D., High School.

Mechanical Drawing. Forty of the 84 schools offering first-year courses in Mechanical Drawing report the course merely under this name, sometimes in addition indicating its elementary character. Five schools report "geometrical" drawing, and five, "working drawings." The following special topics appear several times each in various combinations: projections (orthographic, isometric), machine-drawing, printing and lettering, blocking-in, tracing, blueprinting, perspective, developments.

Fifteen of the 70 schools offering courses in Mechanical Drawing in second year report the content merely by that name, altho "design" is sometimes associated with it. Thirteen report machine-drawing as the sole constituent of the course for this year, and seven, projections. The former is reported as a partial constituent of courses in seven other schools, the other constituents being one or more of the following: developments, intersections of solids, projections, and geometrical drawings. The following are mentioned a few times each in various combinations: sections, penetrations, isometrics, furniture-design, sheetmetal drafting, developments, model drawing, revolutions, etc.

Of the 42 schools offering third-year courses approximately half constitute them in whole, while another seventh constitute them in part of machine-drawing. "Mechanical Drawing" of a more or less advanced character is reported by ten schools. Projections and developments appear in three schools. Design appears in three schools.

Machine-drawing and design are almost universal in the 33 schools offering fourth-year courses. "Mechanical Drawing" is reported in three schools.

Architectural Drawing. This subject appears in first year in but two schools, in second year in twelve schools, in third year in 28 schools, and in fourth year in 22 schools. It is thus seen that practice recommends it for the later years of the high school. This is no doubt due to the fact that it pre-supposes a knowledge of elementary Mechanical Drawing and that it is itself in the nature of a differentiation, i. e., it is almost universally considered an advanced course in Mechanical Drawing. The content is generally reported as "Architectural Drawing," altho the following subdivisions are mentioned several times each: perspective, details, floor-plans, elevations, framing, mouldings, roofs, blueprinting, estimating, etc.

Time Element.

The facts as to the extent of the offering in year-courses in Manual Training have already been presented. It remains to set forth briefly the practices as to time allotment per week in these courses. The great variation in this respect is to be seen in the accompanying table (II),

Table II.

Percentages of Schools Following Various Practices in Time Allottment per Week in Shop Work.

Minutes per Week.	Year-Courses. First Year.	Second Year.	Third Year.	Fourth Year.
90–150	13	8	18	12
160–250	39	38	36	40
260–260	28	29	18	18
400–450	20	25	28	30

which presents the results of a computation of the percentages of the schools making the various time allotments per week in courses in Shop Work. Well-marked model practices are to be found in the original figures upon which the table is based. These are, for instance, in first year, 225 minutes (35 schools), 270 minutes (25 schools), and 450 minutes (eleven schools). These three modal practices signify, respectively, five 45-minute, three 90-minute, and five 90-minute periods per week in the shop. The same general tendency obtains in subsequent shop courses, except that there are smaller proportions of schools reporting the 270-minute allotment, and correspondingly larger proportions reporting the 450-minute allotment.

The time allotment per week for Mechanical Drawing and Architectural Drawing may be seen in the percentages appearing in Table III, which

Table III.

Percentages of Schools Following the Various Practices in Time Allotment per Week in Mechanical and Architectural Drawing.

Minutes per Week.	First-Year Course in Mechanical Drawing.	Third-Year Course in Architectural Drawing.
90–150	20	18
160–250	58	50
260–360	9	7
400–450	12	25

presents the practice in the first-year courses of the former and in the third-year courses of the latter. The facts as to these particular years are used because it is in these years that these subjects are more largely represented in the schools reporting and may be understood fairly to represent the facts for the courses in these subjects appearing in other high-school years. In the original figures upon which these percentages are based well-marked modal practices appear at 180 and 225 minutes, corresponding to two 90-minute, and five 45-minute periods per week for Mechanical Drawing, and 225 and 450 minutes, corresponding to five 45-minute and five 90-minute periods per week, in Architectural Drawing.

II. METHODS.

Main Activities in Shop Work Courses.

The following kinds of activities in courses in Shop Work were listed in the questionnaire and the teachers asked to signify of what their courses are constituted: (1) the making of models, (2) the making of practical individual projects, (3) the manufacture

of commercial products in quantity, and (4) the making of community projects. Table IV contains the results of the compilation of the responses to this request. The figures indicate that practices vary greatly. It appears that in no school does any one of the activities (1), (3), or (4) constitute the sole type of activity of the students. The making of practical individual projects does so appear in fourteen schools. The figures in Table IV are more significant when reassembled in the following manner:

Table IV.

Numbers of Schools Reporting the Various Kinds of Activities in Shop Work.

Kinds of Activities.	Number of Schools Reporting.
(2)	14
(1) and (2)	31
(2) and (3)	3
(2) and (4)	21
(3) and (4)	1
(1), (2), and (3)	4
(1), (2), and (4)	14
(2), (3), and (4)	2
All	6
No Answer	4
	100

Type (1) appears in a total of 55 schools.
Type (2) appears in a total of 95 schools.
Type (3) appears in a total of 16 schools.
Type (4) appears in a total of 44 schools.

It is thus seen that practical individual projects appear in practically all courses in Shop Work, models constitute a part of the courses in somewhat more than half the schools, almost half concern themselves to some extent with the making of community projects, while a relatively small number turn out commercial products in quantity.

Disposition of the Class Period.

The distribution of the class period in courses in Shop Work and Drawing into time for (a) recitation, (b) lecture and demonstration, and (c) laboratory (i. e., actual work by the student) ranged between wide extremes, but it may be said in general that (c) receives either all or nearly all the class time, as is to be expected.

In Shop Work about a fourth of the schools devotes no time to recitation, the other modal practices being 1/10, 1/8, 1/6, and 1/5 of the total time, the last two not being as well marked as the preceding. Almost all the schools devote some time to lecture and recitation, the modal practices being 1/10, 1/8, 1/6, and 1/5, the first named being the practice in 30 schools. The modal practices as to proportion of the time devoted to laboratory work are 3/4, 4/5, and 9/10.

In Mechanical and Architectural Drawing approximately a third and a half of the schools respectively give no time to recitation. The modal practices where such time is alloted are 1/10 and 1/8 of the total time. As in Shop Work, in these two subjects almost all schools report some proportion of time for lecture and recitation, modal practices being 1/10, 1/8, 1/5, and 1/4. The modal practices as to proportion of laboratory work are 3/4, 4/5, and 9/10.

III. AIMS.

The Vocational Aim.

But 22 of the total of 100 teachers report that the paramount aim of their work in this field is vocational. Only twelve of these 22 do so unequivocally, the others adding such qualifications as, "We are going in that direction," "as far as possible," "both vocational and general," "it is so announced," "of some courses, yes." Manifestly, the teachers of Manual Training are for the most part unwilling to have their work considered as vocational preparation.

Some of those who admit the vocational aim name the following occupations as those for which the work prepares: Carpentry, patternmaking, drafting, cabinetmaking, and the work of the machinist. For the most part, however, those interested in the vocational aim lay more emphasis on the general elementary preparation here possible than on actual development of skill and ability necessary to take a place in the trades named.

Other Aims.

The following additional aims were listed in the inquiry blank and the teachers asked to check those which dominate the work in their subjects: (a) prevocational, (b) to develop habits of skill and industry, (c) to cultivate appreciation for beauty in design and for articles of artistic value, (d) to emphasize the informational side of the work (e. g., a study of the properties of wood or metal, the principles involved in construction, etc.), (e) to cultivate social appreciation (interest in human activities). It will be seen in Table V that there is a more generous concurrence in these than in the distinctly vocational aim. The development of habits of skill and industry seems to be an all but universal aim; cultivation of appreciation of beauty in design and in articles of artistic value, and emphasis on the informational side of the work are considered valid aims by three-fourths of the teachers; the prevocational aim and the cultivation of social appreciation are kept in mind by more than half the teachers.

Table V.

Numbers of Teachers Concurring in the Several Aims in Manual Training.

Aims.	Number of Teachers Concurring.
(a)	52
(b)	98
(c)	75
(d)	76
(e)	57

INDUSTRIAL-ARTS MAGAZINE

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EDITORIAL

THE PROPOSED AMENDMENT.

A large number of letters discussing the amendment to child labor laws proposed in our last issue has been received. A large majority of the letters heartily endorse the amendment and see benefit to be derived from it. A few writers seem to feel that it would work a hardship upon the schools and upon the children. Some feel that this amendment would not entirely solve the problem and therefore see no virtue in it.

Undoubtedly the enactment of such a principle into law would not solve the problem entirely. No law will. Our contention is that it will help measurably in solving the problem. The chief obstacle in the way of establishing adequate measures to provide vocational education is the ignorance of real educational conditions on the part of teachers themselves and their attitude toward radical changes. For example, one state superintendent objects to the idea, saying "in case one pupil in a school desired to withdraw it would be necessary to employ a teacher or teachers to give the vocational instruction which that pupil would require." He does not seem to realize that the school statistics of his own state show that between half and three-fourths of the boys and girls 13 years and six months old intend to leave in six months.

To be sure the schools are not at present prepared or equipped to provide for the instruction contemplated in the proposed amendment, and the proposal is aimed to correct that condition. The law would force every school to recognize the fact that a large proportion of its 14-year-old children are going to leave school almost immediately, and that the duty of the school is to prepare them for the impending emergency rather than to continue to prepare them for a high school which they are never going to enter.

One objection which came in a number of letters is that the amendment would tend to cause children to leave school who would otherwise remain. Owen Lovejoy, Secretary of the National Child Labor Committee, writes: "The plan introduced as a general amendment to compulsory education laws would, like any other new thing, be particularly attractive for children and would incline many to come forward with a statement of purpose who, under present conditions, do not think of it, and therefore continue on beyond the 14th birthday." We fear Mr. Lovejoy has not read the proposed amendment carefully. It states that no person *under the age of* 16 shall leave without having given notice, etc.

The enactment of such a clause into law would not correct all the faults of our present conditions, and is not proposed as a complete vocational education law. But we believe that it would force every teacher to recognize the need of such laws by demonstrating that present conditions are intolerable, and indefensible. If such a law had been proposed in the Illinois Legislature two years ago, for example, the school people could not have consistently opposed it, child labor opponents might have endorsed it, manufacturers would have had no objections, but every school in the state would now have on file hundreds of notices of the intentions of pupils, the Chicago schools would have several thousand such notices and school men would be frantically calling upon the legislature for relief, and a comprehensive vocational education law would be enacted.

The first step in securing social legislation is to prove to law-makers that there is a pressing need for it, and the proof must be more than opinions or theoretic conclusions. A bill providing National Aid will have far reaching effects by making school authorities believe that they will get something for nothing from the national treasury, if they will comply with certain conditions. The appeal will be a financial one. Even after the law is passed some school man will have to convince the authorities that they should appropriate funds for the purpose, and it will be a difficult matter to convince some school men of this. But if they had in their own hands documentary evidence of the need which cannot be doubted or evaded they would act of themselves. Wealthy cities like Chicago, New York, Detroit, Pittsburgh, or Milwaukee do not need financial aid from the National Treasury to pay their bills for school purposes. What they need is to be convinced that there is a demand and they will care for it. Boulevards, monuments, municipal concerts, municipal Christmas trees, art galleries are all being provided, and no one complains of the expense.

We believe that if our proposed law were in effect that Congress would not be postponing action on the Smith-Hughes Bill, and state legislatures would not be delaying action on similar laws because of varying opinions on the method of administering laws. The mass of evidence would compel immediate action.

Furthermore, schools would recognize the vocational needs of the pupils while they are in the schools and the opportunity is theirs to have a part in shaping the vocational careers of the children, instead of regretting their lost opportunities when it is too late.

VOCATIONAL ASSISTANCE.

THERE is evidence of better business methods in the conduct of our school affairs. In business it is never adequate to produce a marketable product. The product must be *marketed* before a profit is earned. Some of our progressive schools are not only producing industrial workers capable of service but the schools are organized to find suitable positions for graduates, and to keep in touch with them after graduation.

That the child must be thrown more and more upon his own resources as he advances thru the school course is no doubt proper and necessary, but this does not warrant the school in casting pupils adrift at graduation with no definite occupation in sight or mind.

The placing of graduates in suitable positions for effective work is the great opportunity of the school, as well as its obligation. The organizations of Alumnae have become powerful influences for some schools. There is no more loyal alumnus than the one who has received the direct help and indorsement of his school.

PREVOCATIONAL WORK HANDICAPPED.

It frequently happens that the actions of school authorities with reference to certain important matters are so contradictory as to leave one at a loss to understand the intent and significance of such procedures.

A case in point is the situation in the Chicago schools with reference to prevocational work. In some of the high schools of that city, prevocational courses have been in operation for several years. Such courses in the Lane Technical School have been so successful as to arouse widespread comment. These courses were planned to meet the needs and interests of the over-age, retarded, uninterested boys who find it difficult to get along in the grammar grades of the elementary schools.

But in order for a boy to get out of the regular courses of an elementary school into the prevocational work, he must pass an examination in the regular subjects under the direction of the principal or teachers of the school in which he has been a pupil. In other words, many of these misfits who would be so greatly benefitted by the prevocational courses, are prevented from taking advantage of such work by an examination which foredooms them to failure and disappointment. We are wondering whether the *failure* to pass such an examination might not be a better indication of the need of a boy for prevocational work, than his success in passing it.

Chicago virtually says to many of these boys, "Here are courses adapted to your needs and interests which we propose to substitute for the work you can't do. All you need to do to get into these courses is first to do the work we know you can't do and pass an examination on it!"

This kind of a situation would seem to permit other considerations to stand between boys of this type and their only hope for education of any sort.

A SCALE WANTED.

THERE is one educational agency the work of which no one as yet has attempted to measure with a scale, or to devise a scale by which it may be evaluated. Scales have been made for measuring the teaching of arithmetic, spelling, handwriting, and a number of other subjects. Scales have been perfected for measuring the work of teachers, departments, schools and school systems. The spirit of the times in education is toward basing all evaluations of all educational efforts upon facts determined by accurate measurement of results accomplished, and not upon guesses or conjecture. Any educator who claims results for his work which cannot be demonstrated in measurable results is discredited.

What we wish to suggest is that someone qualified to do so, devise or invent a scale for computing the value of Teachers' Conventions. We do not mean to measure the financial returns to speakers or lecturers, or the political advantages occasionally gained by officers of teachers' associations. The perfecting of a scale which will measure accurately the benefits derived by teachers from the talks, lectures, and breezes would have a very desirable effect upon the character of the programs offered which in turn would result in increased attendance.

The amounts collected from teachers for the support of conventions sometimes run into large sums and in justice to the teachers, such a scale should be perfected in order that they may have more than conjectures and guesses to justify the taxes levied upon them. Those of us who are so enthusiastic over protecting the public by measuring the benefits derived from the expenditure of public funds should be consistent, and be willing to measure for the teachers the returns to them of the money spent for teachers' conventions.

APPRECIATION WHICH IS APPRECIATED.

The Industrial-Arts Magazine has recently received an unusual distinction from three important organizations of teachers of the Manual Arts.

In October last, it was selected as the official organ of the New Hampshire Manual Training Club, one of the livest state associations in New England.

In November, the Boston Manual Training Club, which is the largest body of manual training teachers in any American city, selected the Magazine as its paper and ordered copies to be sent to each member.

In December, the New York School Crafts Club, which includes the shop teachers of the greater city and a number of strong men from neighboring communities in New Jersey, ordered that the Magazine be made its official paper and provided subscriptions for its entire honorary and active membership.

A COURSE IN CLOTHING AND TEXTILES

Results of a Questionnaire by the U. S. Bureau of Education

The Division of Home Economics of the United States Bureau of Education has recently completed a questionnaire on household arts studies with particular relation to clothing and textiles. The results of the questionnaire indicate clearly that household arts courses are rapidly becoming standardized in purpose and content altho great diversity of practice still exists. This diversity is illustrated by some of the typical questions and answers in the questionnaire. Thus:

The questions relative to the planning of household arts courses began as follows: "Please state the age or grade in which you would advocate instruction in handwork, such as crocheting."

The answers quoted below indicate independence of thought and the conviction of experience. All are apparently agreed upon the purpose of giving instruction in crocheting as expressed in the first answer.

"Coarse crocheting is a good preface to needle-work and gives excellent drill in motor control and manipulation."

"Young children of four and five do crocheting in Europe, and there is no reason why our children could not do it."

"Crocheting in worsted and coarse materials in second and third grades."

"Crocheting in fourth grade."

"Crocheting with yarn may be taught children of eight or nine years."

"Crocheting can be begun as early as grade four or five with foreign children especially. Whether it should be offered as a study would depend on the supervisor's ability to weigh the relative worth of studies in relation to a particular situation."

The last writer quoted points relative to the care that must be used in giving crocheting a place in the course. Another goes so far as to altogether question its educational value.

"Handwork, such as crocheting, should be given only incidentally where it is necessary to occupy time and use odd moments. There is too little of educational value in it to use it as a main part of the regular course."

That crocheting has an incidental place in the course is indicated in this reply.

"In any grade where garments are made, simple crocheting could be introduced as a trimming."

A second question read:

"Please state the age or grade in which you would advocate instruction in hand sewing."

That sewing should begin on simple articles of coarse material, with large stitches, is indicated in every one of the replies.

"Hand-sewing in large stitches may begin in the second or third grade, but any formal course in it should not be begun before the fifth grade at the earliest."

"Simple hand-sewing could be introduced in the primary grades and intermediate grades."

"Hand-sewing can be begun in the first grade or even in the kindergarten. Accuracy should not be emphasized until about the second half of the fourth grade."

"Hand-sewing in coarse materials in the fourth grade, in the finer materials in the fifth grade, and from there on thru the course, machine-sewing in the sixth grade and up, pattern-making in a very simple form in the fifth grade but very little before the high school, commercial patterns from the fifth grade up."

"When the girls are ten or eleven years old they may use fine thread. At nine to ten years of age a child should be taught sewing and begin the use of the sewing machine at eleven or twelve years, depending on the size of the girl."

The next inquiry brought forth a discussion of when a girl should learn to make dresses. That there may be some distinction between a course in which a girl learns to make a simple dress and a formal dressmaking course is apparent. That the simple dress can be made in the eighth grade is not questioned.

"Some elementary dressmaking should be done in the eighth grade but a course in dressmaking would probably come in the upper grades of the high school."

"In grade eight the sewing should take the form of the making of wash dresses and simple millinery as well as some objects involving beauty which should be worked out with the teacher of art (as indeed the art teacher should have intimate relation to all textile problems from the beginning)."

"Dressmaking for themselves in the form of simple one-piece dresses may be done successfully in the sixth grade, and above, the more elaborate dresses in the eighth grade (but still simple) and real dressmaking in the high school, costume reduced to its lowest terms may be given satisfactorily in the eighth grade, the elaboration coming in the high school."

"The making of simple dresses can be done in the grade work. Costume design seems to me to be at least a high school subject."

"Dressmaking if defined as ability to make dresses, in high school, the second year; if simply the small garments or dresses of girls, it can be begun as early as the seventh or eighth grade. I believe that all of the home economics subjects can be adapted to even the lower grades, but technical specialization is another matter, as millinery, costume design, etc."

"Real dressmaking may be started in the first or second year of the high school. Children of eleven or twelve will grasp the use of commercial patterns so they can work independently at this age with simple patterns. Simple wash dresses may be taught to girls of fourteen years but more difficult dressmaking must wait for the high school. Fundamental principles of costume design may be taught as low as the elementary school but really original designs cannot be expected until at least the senior year of the high school."

"Drafting of patterns should have little emphasis in any place in the public schools, and when used should be chiefly for the sake of gaining an idea of correct proportions for the better use of the commercial pattern or for the sake of learning the cutting of a sleeve or simple garment without a pattern."

A question relating to the teaching of millinery and costume design brought forth singularly unanimous statements. In only one case was the trimming of hats suggested for grade work. In those schools where the girls do not continue in the high school course such work in the grades might seem desirable.

"Millinery has its chief place in the high school."

"Millinery should come about the same time as dressmaking."

"The trimming and re-trimming of hats can be grade work. Making frames and the more elaborate millinery does not seem to be grade work. It may be included in the high school course. I think only a limited amount of it is practical, as it is certainly not a very vital subject."

"Millinery fits into the ninth year and above that."

"Dressmaking, costume design, millinery, and textiles may well be given in the second year in high school."

"Costume design and millinery should be correlated with design and should come late in the course."

"Costume design should precede or parallel dressmaking."

"Embroidery and design should be taught from the very beginning."

The place of textile study in the schools led to a discussion of particular interest and the replies are rather fully quoted.

"In general it is difficult to specify any particular place where any kind of work should be taught because conditions vary with the needs of the children, with their former training, and with the method of the teacher. The connotation of such terms as are used varies with each person using them. Textiles, for instance, to some means an elaborate and more

or less scientific study, while to others the simple work given in the second grade of choosing colors, working out a simple kind of design, and weaving a holder is a part of textiles."

"Some study of textiles should be started in the lower grades and continue thru the high school, where the subject is pursued in connection with chemistry."

"Textiles should be a continuous subject taught in connection with sewing."

"The study of textiles in a simple way should be begun early in the grades, letting the work develop slowly with the study of clothing and of sewing."

"The study of textiles should be taught as soon as work in sewing is done. The instability of material, price, wear, etc. should be emphasized. The simple history of textile fibers may be given in the grades. More elaborate work of this kind seems to belong rather to the high school."

GLUE FOR MANUAL TRAINING USE

Ralph G. Waring, Syracuse, N. Y.

The best glue for general manual training work is that which is made from hide glue stock, is free from excessive bubbles in the flake or sheet, and does not give off the odor of decomposition when heated, after having been soaked in water. A test sample which shows excessive foaming and gives off a strong odor when in the jelly should not be used. Ground glue is nothing more or less than the flake or sheet glue which has been pulverized to facilitate its reduction to the jelly. This form of glue is less easily detected for poor material in the solid than is the flake or sheet. A glue which can be purchased for thirteen to fifteen cents per pound retail, and is guaranteed by the dealer to be *hide stock*, will in all probabilities be a satisfactory material for shopwork. Glue, gluepots and digestors may be purchased from a number of firms, whose addresses the writer will gladly give inquirers.

Selection and Testing of Glue Materials.

Glue is made principally from animal hides and bones; the better qualities from hides, the poorer ones from bones; altho most glue on the market contains material from both hides and bones. Glue is furnished in flakes, sticks, or in ground form as granules or powder. It is graded by the manufacturers mainly by its "jelly strength," that is by the rigidity or strength of a jelly made in a certain standard manner.

This strength is generally not determined in absolute figures but by a comparison with an arbitrary set of standards (Peter Cooper's standards being most general y used) in accordance with which the quality is designated to be from "2" (worst grade) to "AA-EX" (best grade). The different grades are as follows: 2, 1⅞, 1¾, 1⅝, 1½, 1⅜, 1¼, 1, 1–X, 1–EX, A–EX, AA–EX.

In general this grading is satisfactory, and it has been found thru experience that the grades showing the greatest jelly strength are the best grades for general use. The glue is prepared by soaking in cold water for twelve hours and then heating to 65 degrees C. (149 degrees F.) for one hour. It is allowed to cool until the jelly is thoroly set, then the jelly cake is put into a machine and a ball point is forced against the film until it ruptures. This point of rupture forms the comparison for standardization.

A good glue should absorb much water, the flakes remaining firm and keeping nearly their original shape. The actual amount of water which a glue is capable of absorbing in a given time is indicative in general of the jelly strength, i. e., a high water absorption indicates high jelly strength, in general.

Some grades of glue have an offensive odor of decomposition showing them to be poorly preserved or to have originated from unsuitable glue stock. This odor is not generally noticeable in the solid glue but appears upon melting the glue jelly.

Presence of grease in glue is highly undesirable because it lowers the binding quality. In melting glue jelly, any grease will melt and float on the surface where it can be detected. Absence of grease should be required.

The careful use of glue is at least as important as the selection of glue and continued or excessive heating is one of the worst forms of abuse. Glue manufacturers recommend that glue be not heated above a certain temperature (74 degrees C., or 165 degrees F.), but danger of injury to glue seems to be not so much from over-heating as from continued heating at a moderate temperature. As a general rule glue should be used within 24 hours of the first melting and be melted within sixteen hours of the first soaking. For the proper proportion of glue to water the following table may be of value:

Cost per Pound	Pounds Dry Glue	Plus Pounds Water
17	34	66
16	35	65
15	38	62
14	39	61
13	41	59
12	43	57
11	45	55
10	48	52

(After Friman Kahrs.)

As we need less glue of a good grade and more glue of a poor grade, it follows that the better the glue, the less is needed and the poorer the glue, the more is needed. Therefore the rule is: The smaller the equivalent figure the better the glue. In the comparison between a seventeen-cent glue and a ten-cent glue, 34 and 48 are the equivalents for these two glues. By this is meant that if we want to substitute one of these glues where the other has been used, it will be safe to substitute in the proportion of 48 to 34, or 34 to 48, as the case may be; provided, of course, that the point we want to be assured of is, that we have in either case the same quantity of glue liquid, which liquid shall have the same body and for that reason the same covering capacity.

There are two kinds of glue deterioration. When moistened, or in the form of a cold or fairly cool jelly, there is deterioration due to fungus or bacterial growth, resulting in liquifaction and loss of viscosity. In the melted condition during heating there is loss in what is commonly called "fiber strength." The last named loss is the more serious as it takes but four hours heating at 66 degrees C. (150 degress F.) to reduce a grade No. 1 glue to grade 1¼, thus practically deteriorating 11 per cent in value; or 24 hours heating at the same temperature to reduce it to grade 1½, or 22 per cent loss in value. Quality of glue is frequently blamed for poor results, when in reality it is the handling by the consumer which causes these results.

In general, then, the best recommendations are to reduce the stick, flake, or sheet glue to a powder by pounding in a sack, adding water in given amounts to a given amount of glue as per value in the table, soaking this material twelve hours in cold water and boiling for one hour at 150 degrees F. It is best to calculate as near as may be the amount of glue which will be used in the shop for a week, and soak up enough flake to produce this amount, making up fresh each Monday morning. It should be heated in some form of double boiler; and where electricity is available, one of the flat, round toasters which retail for about $2.75 will be found to be very economical and efficient for heating work.

SOME RESULTS OF THE EVANSVILLE SURVEY.

A survey of Evansville, Ind., for the guidance of vocational education work has been completed under the direction of Charles H. Winslow, acting for the State Department of Education.

As a result of the work a director and assistant director of vocational education have been named; prevocational work in all the grades of the schools has been reorganized and the time allowance raised from an average of 35 to 125 minutes a week; six additional teachers have been employed

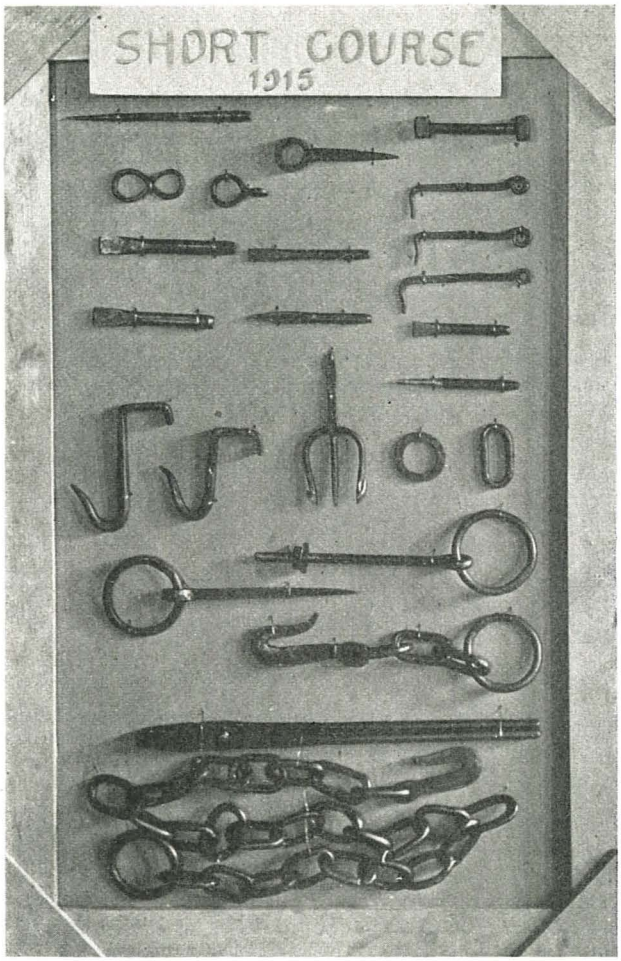


Exhibit of Forge Work by the Short Course Students of the Spring Valley, Minn., High School. Mr. Stanley Mythaler, Instructor.

and evening classes in carpentry, agriculture, laundry, chemistry, dietetics for hospital nurses and home nursing have been formed.

Commerial education, physical training and courses for women in plain sewing, millinery, home nursing, meal planning, dressmaking and sewing have been introduced.

A strictly vocational course in machineshop practice has been begun in which the pupils divide their time between book recitations and work in the shop. A course in furniture and millwork has been started with thirteen boys.

The high school has added a prevocational course in printing. The course is under the direction of a practical printer, and has an equipment valued at $800. In addition a beginning has been made in agricultural education and the conduct of a home project plan.

One of the most important things accomplished, in the opinion of Mr. Winslow, is a new system of work permits in which strict accountability is demanded of the schools for all permits to leave school. The superintendent is to be held responsible for all permits and is required to keep records of the same. Teachers are in duty bound to win back to the schools every pupil possible.

BUSINESSMEN AND INDUSTRIAL ART.

The European war has served to bring the subject of Industrial Art under active discussion in all parts of the country. Following the example of the Chicago Chamber of Commerce, many other bodies of similar nature have begun a campaign for a closer co-ordination between the art of the public schools and the art of business. It was Dr. Haney, director of art in the high schools of New York City, who, in May last, brought this subject before the Chicago Chamber of Commerce. Since then he has been called upon to speak before various commercial organizations, from New York to Denver. His is a plea for industrial preparedness. In speaking before the Chicago Chamber of Commerce, Dr. Haney said:

"The idea that we are able in this country to develop our educational system by ourselves, and without reference to educational systems elsewhere, is an error. How grave this error is, in industrial art education, one can scarcely realize until one comes to study in detail the industrial preparedness of our foreign competitors. Art education in these countries is of serious concern to the state. It is regarded, economically, as one of the most important things that the state can be interested in, for on every hand it touches industry.

"Every manufacturer, or man who handles a manufactured product, should understand that art plays a definite part both in the construction and in the sale of that product. It appears in the design and color of the goods themselves, in the cartons in which they are packed, in the boxes which hold the cartons, and the labels on the boxes; in the printed circulars which advertise the goods, in the merchant's window in which they are displayed. The man who knows how to buy advertising, good in design and color, how to devise well-printed matter, how to pack goods attractively and to show them in a window so that they will draw trade, that man, by virtue of his practical knowledge of art, is bringing dollars to himself and reputation to his town and state."

TYPE OF TEACHER REQUIRED FOR CONTINUATION AND INDUSTRIAL SCHOOLS.

(*Concluded from Page 77*)

for these. The graduates of these schools have had the special training needed for the teaching of mechanical drawing and shop mathematics, and with some practical shop experience, to put them in sympathy with the industrial workers, they are the type of teacher needed for the boys.

The technical schools are also the source of supply of the women teachers who must carry the work in cooking and sewing.

For the non-vocational teacher a normal school graduate with some, but not too much, experience is best, altho others especially adapted to this field may succeed in it. But normal school graduates or not, the person needs to have a sympathetic insight into industry.

The non-vocational teacher cannot use the methods followed in the regular elementary or high school. The work must be of such a character that it functions in the lives of the individual pupils. I would choose for this work people of broad general scholarship, and with active sympathies, people who can find out the needs of the unclassified lot of children who come to them, and who will have the willingness, the skill, and the patience to minister to those needs—intellectual, moral, physical, social.

I have said little about the personal equipment of those who are to teach in these kinds of schools. Suffice it to say that the standard set for the regular school should in no way be lowered in this. Boys need men whom they can look up to as ideals in manners, habits of dress, and of living, and girls need women of the same sort and for the same reason. Those whom boys and girls admire they strive to emulate and imitate.

As to the attitude of mind, the teachers of these schools should surely be people who are progressive and open-minded, and who have not ceased to grow.

For all sorts of teachers, vocational and non-vocational, I would name another common quality, characteristic or possession which I think to be of immeasurable value. It is a live social consciousness. It is this that gives the teachers faith in their work and enthusiasm for it; because they feel that in ministering to these children in industry, they are performing a high form of service to the community. The social consciousness is the realization that the social whole can claim no better or higher status than that which is the average of all its component elements; and that all effort to lift a little higher the level of even the "least of these" contributes to the general social benefit.

It is this attitude which makes any teacher a high type of teacher, and such types are needed especially in our continuation and industrial schools."

EDUCATION IN 1916.

According to a recent report of the United States Bureau of Education for the year 1916, there were 23,500,000 persons attending schools of some kind, which means that about 24 per cent of the inhabitants of the country are attending school as compared with nineteen per cent in Great Britain, seventeen per cent in France, twenty per cent in Germany, and a little over four per cent in Russia. The Bureau points out that this result is not favorable to this country when daily attendance, rather than enrollment, are taken into consideration, for some of the European nations have better attendance and a longer school term.

The number of pupils in public kindergarten and elementary schools has increased from 16,900,000 in 1910 to 17,935,000 in 1914, or an increase of more than a million in four years. In the same period, the number of high school students increased from 915,000 to 1,219,000, while in 1915 the corresponding figure was 1,329,000. At present, the total number of high school students in the 14,000 high schools amounts to a million and a half. There are about 8,440 high schools with full four-year courses and approximately 93 per cent of the students are enrolled in four-year high schools.

The number of teachers in the United States is 706,000, of whom 169,000 are men and 537,000 are women. The number of men teachers has increased slightly since 1900 while the number of women teachers has almost doubled. In the elementary schools, during the same period, the number of men teachers has decreased twenty per cent and women teachers have increased eight per cent. Teaching positions in high schools were evenly divided between men and women in 1900, but women teachers in these schools outnumbered the men by about eight thousand in 1916. The average salary of all teachers is $525. The highest figure is reached in the East and North Atlantic States, with $699 and $696, and the lowest in the South Atlantic States, or $329.

The expenditures for educational work in 1914 are estimated at $800,000,000 which, together with estimates for the intervening two years would make the total about a billion dollars. Public elementary schools in 1915 cost $500,000,000; high schools, $70,000,000; private elementary schools, $52,000,000; private secondary schools, $15,000,000; universities and colleges and professional schools, $100,000,000; normal schools, $15,000,000.

Of the $555,077,146 actually spent for public schools in 1914, $398,511,104 was by the North Atlantic and North Central States, New York leading with $66,000,000. Pennsylvania ranked second with $52,000,000, Illinois third with $39,007,314, Ohio fourth with $35,172,950, California fifth with $26,579,804, Massachusetts sixth with $25,492,292, and New Jersey seventh with $23,284,096. Six states expended less than $2,000,000. In per capita cost, Utah ranked highest, with an expenditure of $10.07; Idaho expended $9.66, North Dakota $9.62, Montana, $9.50, Arizona $8.93, and Washington $8.89. Georgia was the lowest with $1.98 for educational expenditures.

RANGE MANUAL ARTS TEACHERS MEET.

The annual meeting of the Range Manual Arts Association was held December 9th, at Virginia, Minn. The meeting was well attended and a number of the Range superintendents were present.

Mr. Wm. H. Mulvey of Biwabik, Minn., gave a talk on Shop Management which was followed by discussions by the members present. The sweeping of shops by pupils was deprecated by Mr. R. W. Elliott, who argued that the boys' time is too valuable to be spent in such work. He urged that the time be given to more important work in the shop. This viewpoint was received by the other members with approval.

The meeting closed with the election of the following officers:

President, M. B. Elson, Gilbert, Minn.; vice-president, Maurice J. Nelson, Virginia, Minn.; secretary-treasurer, W. F. Anderson, Mountain Iron, Minn.—*H. A. Shepard.*

E. A. T. HAPWOOD,
Recently appointed Director of Manual Arts, East Orange, N. J.

ALVYN G. HOSTETTER,
President-elect, Industrial Arts Section, Iowa State Teachers' Association, Des Moines, Ia.

THE OKLAHOMA MEETING.

The Manual Arts Section of the Oklahoma Education Association met in Oklahoma City, December 1, 1916, with Chairman H. F. Rusch, director of manual arts for Oklahoma City, in charge. The papers given before the meeting were as follows:

A Class Demonstration, E. J. Ward, Shawnee; General Classroom Organization, A. W. Hornung, Oklahoma City; First Aid to the Injured, H. H. Cloudman, M. D., Oklahoma City.

The papers were well received and much interest shown in them and the discussions that followed each. Dr. Cloudman's paper was particularly valuable, for all shop men have to meet the problem of caring for he injured and few are well versed in correct practices in first aid.

Twenty-three cities were represented at the meeting with from one to nine teachers each. There are many smaller towns in the state that have added manual arts within the past two years.

In the Business Session the officers chosen for the coming year were:

Chairman, C. E. Paul, Muskogee; vice-chairman, E. J. Ward, Shawnee; secretary-treasurer, Geo. E. Davenport, Elk City.—*Geo. E. Davenport.*

TEXAS TEACHERS MEET.

The annual meeting of the Industrial Arts Section of the Texas State Teachers' Association was held at Fort Worth, Texas, December 1, 1916. Chairman L. W. Fox presided.

Mr. Arthur B. Mays, of Huntsville, discussed "The Teaching of the Practical Arts Adapted to the Needs of the Community;" Mr. Chas. S. Meek, of San Antonio, argued for "Vocational Training in the Public Schools;" Prof. F. E. Giesecke, of Austin, outlined a course in "Architectural Drawing for High Schools;" and Mr. J. C. Burleson, of San Antonio, handled the problem of "Making the School Shops Meet the Needs of the School."

A feature of the program was an exhibit of the manual arts department of the Fort Worth public schools. A complete exhibit of the work in both shop and drawing from all the grades and a detailed typewritten outline of each section of the work was shown. It was the most complete exhibition ever shown at a meeting of the State Teachers' Association and created a very favorable impression.

Abilene, Texas. The board of education recently purchased manual training equipment amounting to $2,000 for the woodworking shop which was organized in January. The woodworking machines were bought from the Fay & Egan Company and the benches from E. H. Sheldon & Co. The board also purchased $500 worth of equipment for the domestic economy department which has included dressmaking and millinery in the course in domestic art.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects.

A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be mailed flat and should be addressed:

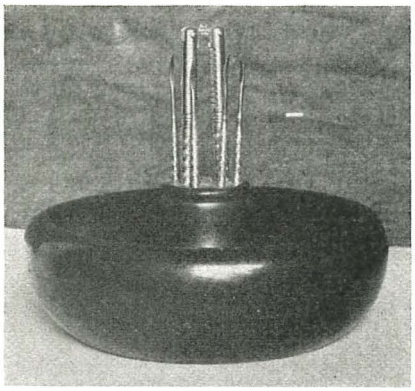
The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

PROBLEMS IN WOODTURNING.

Edward F. Myers, Director of Manual Arts, Springfield, Ohio.

The designing of projects for the woodturning classes has become increasingly difficult. Wideawake manual training teachers who want new problems will find a good one in the accompanying photographs showing four types of nut bowls.

The turning and polishing of the bowl needs no explanation other than the use of a small iron face plate and plenty of oil or wax and shellac.



Type D, Nut Bowl.

Types A, B and C call for patternmaking and foundry practice. Type D explains itself. Type C may be made in the shop with no foundry in connection by turning a center stem of wood and boring a hole for a turned cross piece.

The handles and feet may be cast in brass, hammered and nickel-plated, or cast in gray iron, plated and polished bright. The picks and cracker may be purchased from any five-and-ten cent store for twenty cents a set.

The writer has been using this model in his woodturning classes and finds it very successful.

HOOKS, EYES AND LOOPS.

Marian L. Whitwood, Fresno, Cal.

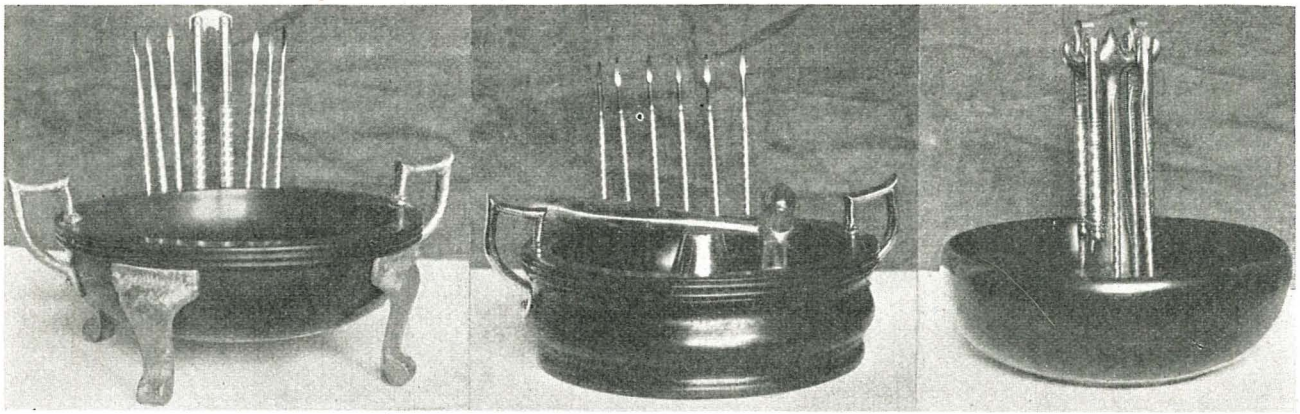
The hook and eye, when properly sewed on, should remain in place during the life of a garment, unless the process of laundering bends them out of shape so that it is necessary to remove and replace by new ones. On a garment not subjected to the wear and tear of wringers and mangles, it should seldom be necessary to replace a hook or an eye, provided, of course, that they are securely sewed on in the first place.

The hook should be so placed that when the closing is accomplished, there will be no part of any fastener visible. After placing the hook, adjust the eye to fit. Where edges are to meet, as in a fitted lining, use the old-fashioned eye, but if edges are to lap, the invisible eye is preferable. When fasteners must be put upon lace, net or other sheer material, where it is difficult to keep it invisible, thread loops should be used. These may be made with thread or sewing silk the color of the material on which they are placed. The accompanying hook should be the smallest made and, if possible, put under a figure in the lace.

As the hook is put on the *under* side of a band, plait or hem, the stitches should be taken thru *one* thickness of goods only and the thread should be fastened on the side where the hook is placed; no stitches should be visible on the right side. As the eye is placed on the upper side, it is not necessary to be so careful and it is just as well if stitches are taken thru both thicknesses of goods.

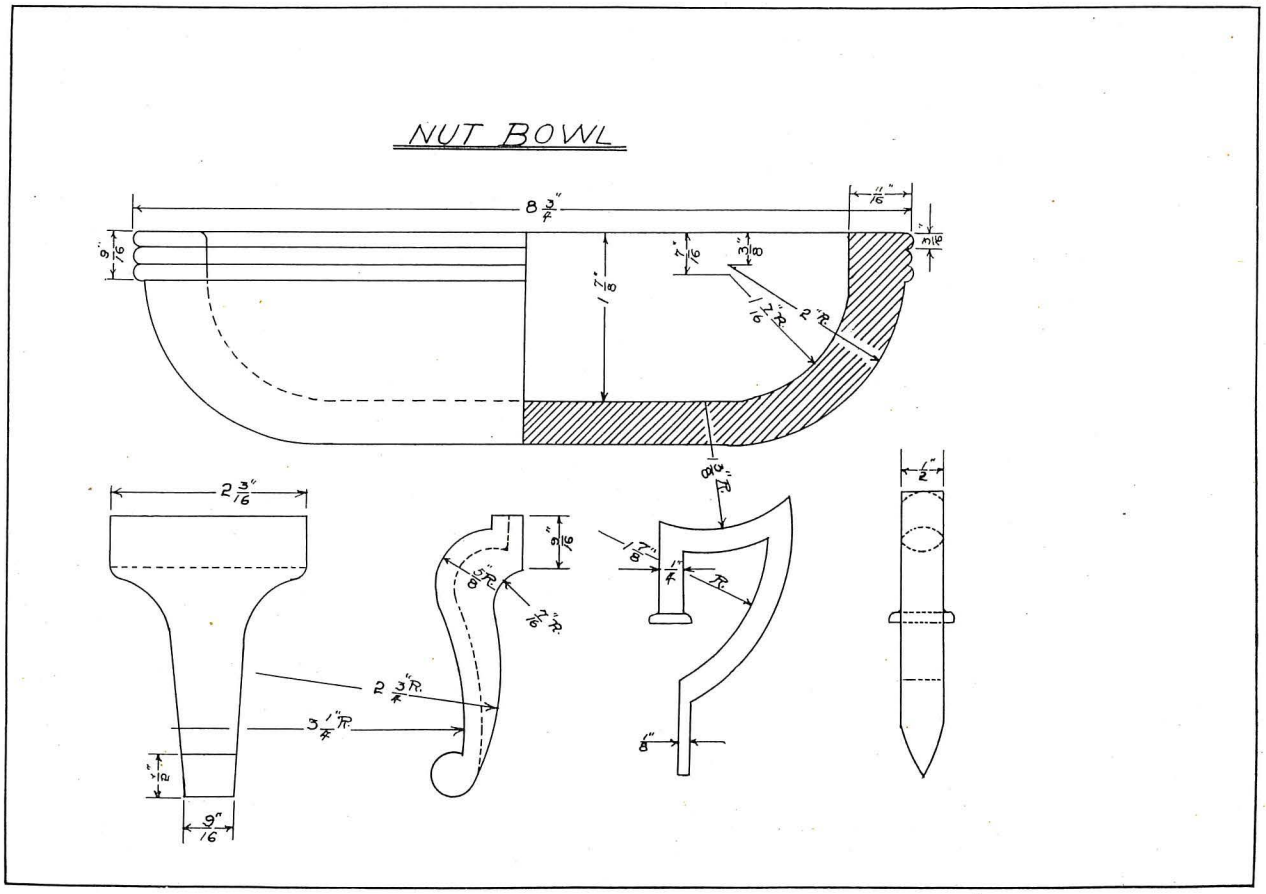
Hold the hook securely in place with thumb and first finger of left hand, take a stitch over and over to fasten thread at point *a*, see Fig. I. Passing point of needle up thru cloth and ring of hook, proceed with button-hole stitch around ring, sewing over end of thread a few times to hide and fasten it, after which it may be cut off. Button-hole stitch is made by passing threads from head of needle around under point of needle, from side *toward* you to opposite side, and drawing needle up and out to right. They should be drawn gently but firmly into place. Proceed in same manner around ring to point *b*. Slip needle between goods at *b*, bring up at *c*, pass thread under bill of hook and, inserting between goods at *d*, bring up at *c;* repeat four or five times until sure it will stand strain put upon it. Now pass needle between goods at *d*, and bring up at *a*, where thread is fastened by sewing over and over several times. The end of the hook is the place where it is soonest ripped loose and the likelihood of this is lessened if fastening is at *a* instead of near the end.

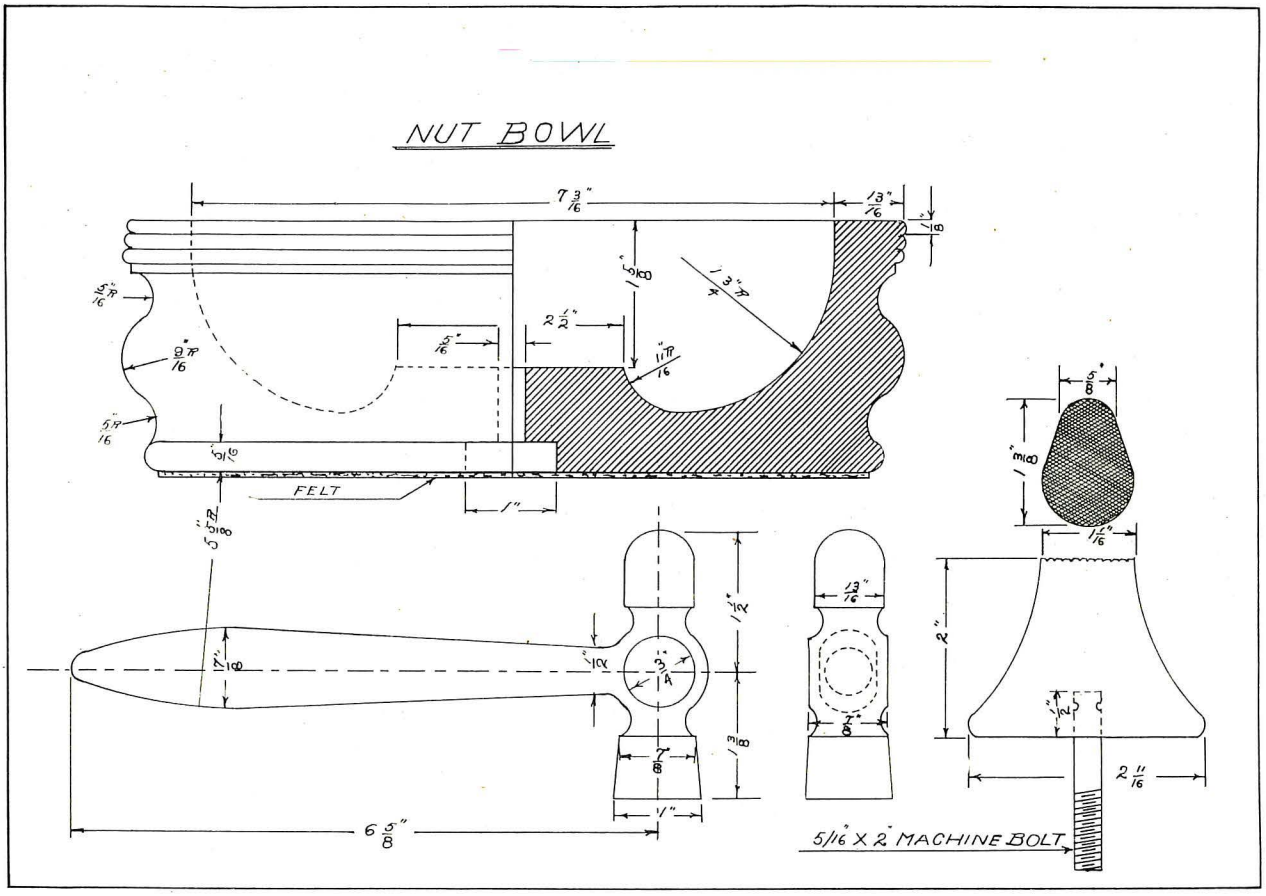
Holding the invisible eye in place with left hand, fasten thread same as for hook, at *a*, see Fig. II; button-hole around ring to *b*, put needle down at *b* and up at *c* and button-hole



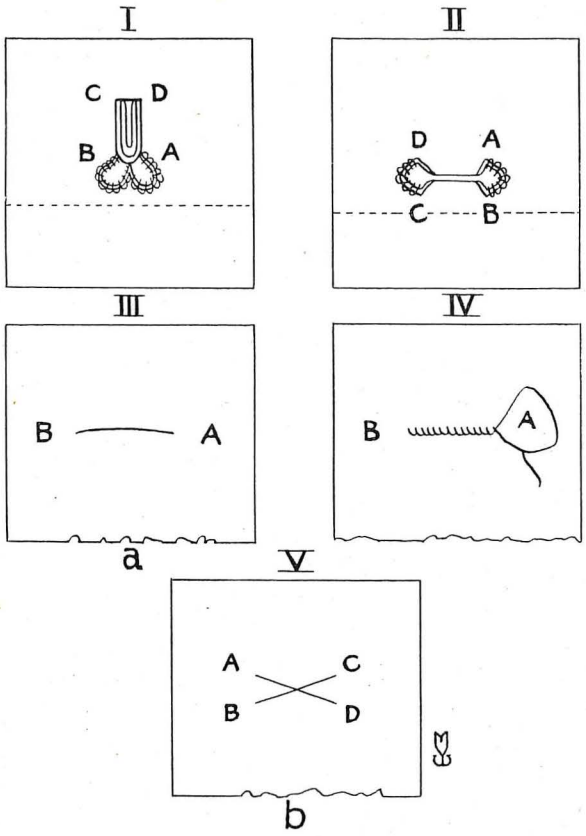
Type A. Type B. Type C.

NUT BOWLS DESIGNED AND MADE IN THE CLASSES OF MR. EDWARD F. MYERS.





DETAILS OF NUT BOWLS DESIGNED AND MADE IN THE CLASSES OF MR. EDWARD F. MYERS.



Details of Hooks and Loops.

around ring to *d;* here pass needle to under side and fasten securely.

The old-fashioned eye is put on in practically the same way, except that the rings are usually placed on the wrong side of hem or band and loops extend beyond the edge. A casing is often put on last to hide rings, especially where they are used on a skirt placket, where they must be placed on the right side of the garment.

Thread loops are made in two ways, usually depending upon which way goods makes it most practicable.

(a) Holding edge of closing toward you—see Fig. III, pass needle down at *a* and up at *b*; repeat three or four times, leaving loops rather loose, using *single* thread with no knot. Now insert head of needle under all of threads, holding thread from needle to left of needle with left thumb, bring needle up and draw gently to left and toward you. This is what is termed "blanket-stitch." Repeat until loop is covered smoothly with blanket-stitches, pass needle to under side near *a*, being careful to put it down at such a point that loop does not turn over; fasten securely on under side. See Fig. IV.

(b) Holding edge of closing to right—see Fig. V, pass needle down at *a* and up at *b* (which should be a little less than $\frac{1}{8}''$ apart), down at *c* and up at *d;* repeat, finishing foundation by going down at *a* and up at *b*, which should leave two threads crossed each way. Now turn work with edge of closing toward you and blanket-stitch to other end, as in other kind of loop; fasten in same way. Finished loop should look the same on the *right* side as the other kind.

A DOLL'S CRADLE.

E. M. Cook, Des Moines, Ia.

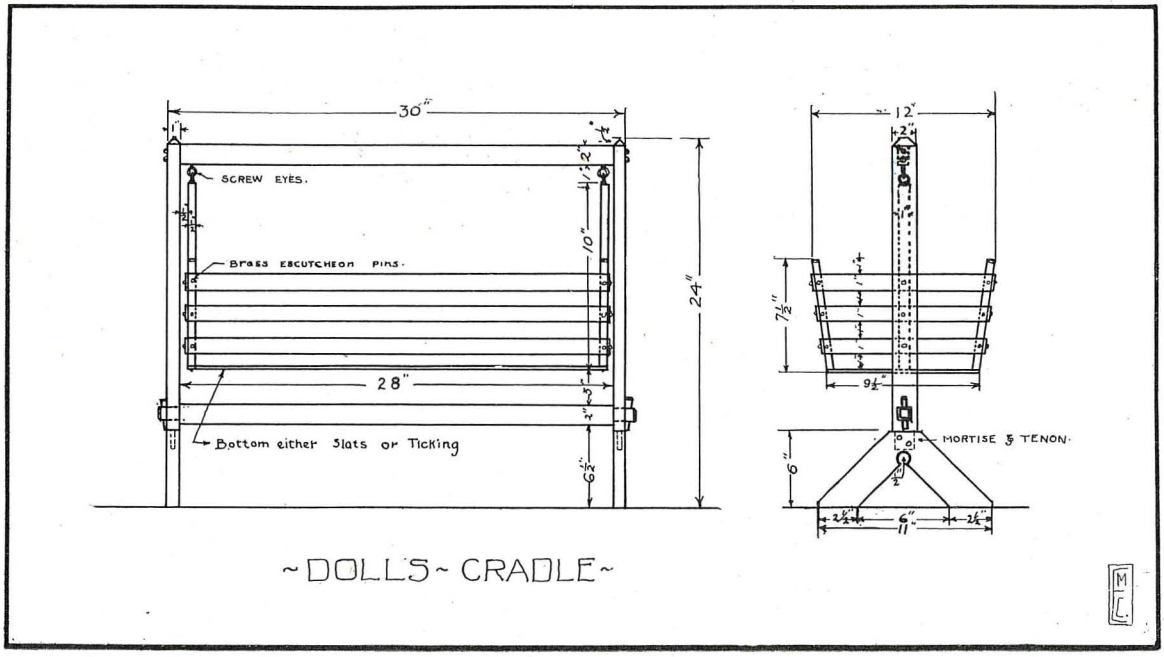
The cradle is a project that takes very little material and at that only such material as one finds in the scrap box, the kind that the janitor's wife likes for kindling. One who has a power saw may very readily use these, but the one who has not the material for the slats, may purchase them at any mill in the form of $\frac{1}{8}''$ veneer; or they may be ripped from the edge of an inch board, the one in this case having been made in this way.

The fastenings may be either small round-head brass screws or escutcheon pins, taking care to drill the thin wood to avoid splitting.

This type of cradle has proven very popular among the children as it is different and stronger than the ones generally found in the stores. The pupils like them as they are readily saleable at from $2.50 to $3.50 each. Anyone will realize this as they go thru the stores and try to find suitable playroom furnishings of the substantial kind.

Bill of Material.

No. Pcs.	T. W. L.
2 Ft.	1″x6″x11″
2 Uprights	1″x2″x20″
1 Bar	1″x2″x28″
1 Stretcher	1″x2″x32″
8 Strips	$\frac{1}{8}''$x1″x27″
8 Strips	$\frac{1}{8}''$x1″x12″
4 Corners	$\frac{3}{4}''$x$\frac{3}{4}''$x7$\frac{1}{2}''$
2 Suspensions	$\frac{1}{2}''$x1″x10″
Cloth	10″x30″
Pins and screws	
4 Screw eyes	



LETTERS TO THE EDITORS

THE SPRINGFIELD SURVEY.

To the Editors:

An editorial on "The Springfield Survey" in the December number of the *Industrial-Arts Magazine* attracted my attention by a point of view and attack that seemed quite different from the thoughtful, fairminded treatment your editorials usually indicate. Have you treated the Springfield Survey with your usual fairness?

When an organization of recognized standing in educational circles makes a study of Vocational Education in a city system, and after carefully analyzing the situation, proposes radical changes, wouldn't it be more profitable for us to treat the recommendations with thoughtful consideration rather than with ridicule? Even though there may be obvious faults in the recommendations, shouldn't we be expected to weigh the elements in the plan rather than to dispose of the scheme by laughing it out of court?

The chapter of the Survey under consideration is entitled "Vocational Education." In your treatment of the report, have you distinguished between the aim of Manual Training and the aim of Vocational Education?

Are we afraid of radical changes? Do we want to keep course organization and methods just as they are? Are the recommendations a "joke" because they call for doing jobs for the school plant? Numerous articles have been printed in the *Industrial-Arts Magazine* describing work done by boys on school plants. Didn't the work appeal because of its reality and practicality? Didn't the writers of these articles claim exceptional advantages for the boys as a result of their experience in doing this work? Is the report a "joke" because of the requirements set up for the staff of instructors? Would none of the Manual Training teachers qualify with journeyman skill, good use of English, and a liking for boys? The report states teacher training is not necessary, but it does not state that teaching skill is undesirable.

Do we know the scheme cannot be made practicable? The report states "the plan is neither complete nor inclusive." Couldn't a wise supervisor with a broad vision, properly selected instructors, and a budget increased three fold, take the recommendations of this report, organize and adapt them, and contribute to the welfare of the children of this community in a way that would bring to the school system pronounced appreciation from the parents and public?

In writing these reactions on your editorial, I hold no brief for the Russell Sage Foundation. The chapter on Vocational Education in the Springfield Survey Report is open to criticism. My plea is that the circumstances seem to warrant careful analysis of the recommendations as a basis for forming an intelligent judgment of the plan and its possibilities.

Requesting that this plea may be published in the *Industrial-Arts Magazine*, I am

Very truly yours,
E. E. MacNary, Director.

Springfield, Mass., Jan. 2, 1917.

Perhaps we did not emphasize sufficiently the point we wished to make in the editorial in question. We believe that when it is demonstrated that the recommendations of a survey committee or other educational body are unwise or impractical, the body making the recommendations should publicly repudiate them and acknowledge their errors. The reports of the Russell Sage Foundation become material for study in departments of Education and are recognized as authoritative. Persons preparing themselves for teaching read these reports and form their opinions from such literature. Teachers' Associations read and discuss the reports and sometimes attempt to put the recommendations into operation. An unwise recommendation can therefore do immeasurable damage. Therefore it would seem important for such reports to contain only such recommendations as are advisable to accept and put into operation, and the body making an unwise recommendation should be willing to withdraw it and to make an effort to undo any damage that may have been done by its former recommendations. We believe Mr. MacNary will agree with this.

In our issue of October, 1914, we discussed the report in question somewhat fully, and with somewhat thoughtful consideration. The recommendations on this point have been discussed in several meetings of industrial arts associations. Criticisms have appeared in several publications. The school authorities of Springfield have not even attempted to put the recommendations into practice. No school system that we know of has turned its entire manual training department into such a school repair establishment. We believe we can prove that the recommendations are impractical, unwise, and contrary to accepted educational principles, and even contrary to other recommendations made by the same educational body that made these recommendations.

While Mr. MacNary is correct in stating that the chapter under consideration is entitled "Vocational Education" at the same time the recommendations deal with a manual training department. Because we distinguish between the aim of Manual Training and the aim of Vocational Education, we take exception to the recommendation that the entire existing manual training department undertake to make its work that which might be advisable in a vocational school, but clearly inadvisable in a manual training department. There was no department of vocational education in the Springfield Schools and the recommendation to discontinue a manual training department and turn the shops over to the school repair department seems to us contrary to wise educational procedure. Our objection is not to doing practical work or giving the boys real experiences, or to making radical changes, but to say such work "would take the place of the manual training work now carried on in elementary and the high schools" seems to us to be a joke, altho the results would be perhaps too serious to be considered jocularly.—*Editors.*

THE PAY OF ROCHESTER TEACHERS.

To the Editors:

In the January number of the *Industrial-Arts Magazine* appears an article entitled, "Salaries of Manual Training Teachers." In it special reference is made of the salaries of directors and teachers of manual training in Rochester, N. Y. The facts are as follows:

Assistant Superintendent $4,000
(In charge of Vocational Education and Manual Training.)

Assistant in Vocational Education $1,600

Teachers of Manual Training (Elementary).

	Minimum Yearly Salary	Yearly Increase in Salary	Years Required to Reach Maximum	Maximum Yearly Salary
Women	$500	$ 50	11	$1,100
Men	900	100	3	1,200
High Schools and Vocational Schools (Men) ...		100	..	1,800

Yours very truly,
Joseph P. O'Hern,
Assistant Superintendent of Public Instruction,
Rochester, N. Y.

January 4, 1917.

A Correction.

A news item in the December issue of the *Industrial-Arts Magazine* credits the work of a team of boys representing the St. Johnsbury High School to Mr. L. H. Baxter, instructor. The head of the manual training department is Mr. Frank L. Cain, under whose direction the class worked at the Springfield contests.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Scene Painting.

551. Q.—What books would assist me in color schemes and scenic painting for small dramas, also books on good color harmony for a small room and office?—*C.W.B.*

A.—A practical book on scenic painting is "Practical Guide to Scene Painting" by F. Lloyds, published by Geo. Rowney Company, at 52 Rathbone Place and 29 Oxford Street, W., London.

Good books on interior decoration, including chapters on color harmony with reference to interior decoration, are: "Interior Decoration; Its Principles and Practice," by Frank Alvah Parsons, published by Doubleday, Page & Company, Garden City, New York; and "House Furnishing and Decoration" by Abbott McClure and H. D. Eberlein, published by McBride, Nast & Company, New York.

Miscellaneous.

459. Q.—Can you give me a formula for gum labels on glass and tin? The names of several reliable iron-mongers in New York? Properties and uses of the wood of the elder-berry tree (Sambucus)?—*H. D.*

A.—Tragacanth, 1 ounce; acacia, 4 ounces; thymol, 14 grains; glycerine, 4 ounces; water, sufficient to make 2 pints. Dissolve the gums in 1 pint of water, strain and add the glycerine, in which the thymol is suspended; shake well and add sufficient water to make 2 pints. A single shake mixes it sufficiently for use.

Druggists' Label Paste: Wheat flour, 4 ounces; nitric acid, 1 drachm; boric acid, 10 grains; oil of cloves, 5 drops, and carbolic acid, ½ drachm. Stir flour and water together, mixing thoroly. Add the other ingredients. After the stuff is well mixed, heat it, watching very carefully and remove the instant it stiffens.

Labels on Glass: Acacia, 4 drachms; tragacanth, (powdered) 2 drachms; glycerine, 1½ fl. dr.; thymol, 5 grams; alcohol, 1 drachm; and water sufficient to make 4 ounces. Dissolve the acacia in ½ ounce of water; rub up the tragacanth with 1 ounce of water, mix the two, and strain thru a cloth. Add the glycerine and the thymol, first dissolving the latter in the alcohol.

2. Patriache & Bell, 215 Pearl St., New York; Hogan & Son, 273 Pearl St., New York.

3. The Sambucus has a rough, gray bark; the wood is dense, light brown in color and soft, and the branches are pithy. It is used for making pipes and horns, and for certains toys. Some barrels are made from the winter-hewn wood. Sambucene or terpene is derived from Sambucus Nigra.

Finishing a Bedroom Set.

564. Q.—I am about to finish a bedroom set and am undecided whether to paint it white, yellow or gray. In either case, I would like to know the best method to follow as to the first coat, how many coats needed and also how the egg-shell finish is obtained. Birch would be the best wood to use for any one of these finishes, but I had used Oregon pine because any other wood is too expensive in this locality. —*B.M.H.*

A.—I am glad that the question of a suitable finish for the softer woods has been presented at this time. There is a mistaken idea prevalent, especially among manual training instructors, that pines, basswood and poplar are not suitable for furniture. True it is that birch is the ideal wood for the enamel finishes but this choice is largely influenced because of the resistance of the wood to bruises. Outside of this fact, practically any wood can be used for enamel work. The whole question as to suitability is entirely dependent upon the preparation of the wood for the finish. The method is very general for all woods and may be summed up as follows:

First, sand the wood very carefully, being absolutely sure that a level surface has been produced free from all ridges occurring between the regions of spring and summer growth, as in the pines. Following this, coat the work carefully with a coat of shellac reduced one-half with alcohol. Sand smooth with 00 sandpaper until free from tooth and nibs. If the wood requires filling, do this as directed on page 512 of the November, 1916, number. After the filler has dried 24 hours, the procedure is the same as for other woods.

Now coat the work with a paint made of 75 per cent white lead, 25 per cent zinc oxide and reduced with turpentine to the proper working consistency. Let this coat dry two days and then sand smooth. Coat with a second coat tinted as desired with medium chrome yellow or ivory black ground in Japan. Let this coat dry three days and sand smooth. Dust the work thoroly and brush on a thin coat of Pratt & Lambert's Vitralite Enamel. If it is desired to tint this enamel, add enough chrome yellow or ivory black in Japan to produce the desired shade. I would suggest that the lighter tints of ivory and gray be used instead of the deeper tints of cream and medium gray. One soon tires of the stronger colors and the lighter tints lend themselves more easily to most color schemes. The enamel coat should dry four days and then be rubbed with F pumice stone, felt pad and water.

When an even surface has been obtained, sponge off all pumice stone and wipe perfectly clean with a chamois. Then coat with a last coat of the enamel and after letting it dry one week, rub with FF pumice stone, felt pad and water to a perfect surface. Wash clean, and dry with a chamois. Polish with a clear polishing oil if a dull finish is desired or if permanently polished, rub with rotten stone, felt and water as long as necessary to obtain a polish. Then clean up with water, dry with a chamois, and polish in oil. Use a good egg-shell gloss enamel which will save the last rubbing in case a dull finish is desired. Such a finish, however, is not to be compared to a genuine water-rubbed finish, as all egg-shell or flat finishes are more or less valuable imitations of the genuine finish.—*Ralph G. Waring.*

Finishing a Red Cedar Chest.

567. Q.—I would like to know of one of the best finishes for a red, knotty cedar chest. How are you going to fill up little places where the board has been gouged out or part of big knots?—*C.T.*

A.—I would like to suggest the following method as a reply to the above question:

After the chest is entirely assembled and all fittings properly attached, remove the latter and the hinges of the top. This will avoid any possibility of injuring the finish in case a screw driver should slip.

Now proceed to sand the case very thoroly and if any small holes have been left in the wood as a result of knots or grain, these may be filled in one of two ways. The first and easiest, perhaps, is to buy colored stick shellac from the paint shop. These sticks occur in quite a range of colors, most of which are very good matches in the natural and stained finishes. For instance, in cedar you will need a stick of the very palest cream and the medium shade of red. This shellac is melted into the holes in the wood until a little more than level full. The best method of accomplishing this is to take an ordinary putty knife, heated in some flame free from soot and with it run the shellac into the hole, using a fairly warm blade to smooth over the shellac and work out any air bubbles. These spots should then be sanded down until nothing shows of the shellac but the mass in the hole itself. It is necessary that no thin film of this colored shellac be left adhering to the wood adjacent to the hole, as this will result in what appears to be a colored spot, under the varnish